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ARTICLE IX.

ABOUT POCKET SURGICAL CASES.

BY E. ANDREWS, M.D., Professor of Surgery in Chicago Medical College.

The object of a case of pocket surgical instruments is, that the practitioner may always have with him a small supply of such instruments as he most frequently uses, and a few others which, though not so often required, yet are occasionally called for with such urgency and suddenness as to admit of no delay. The size of the case should be as small as possible, and the material of it such as to be durable, handsome, and capable of excluding moisture.

Unfortunately, most of the cases which are sold, are combined by the makers without sufficient consultation with surgeons; hence the material of the case is generally morocco, which soils, wears out, and always admits dampness, and the interior of it is lumbered up with an excessive variety of forceps and scissors to the exclusion of better things. Several passable cases, however, have been produced, among which, for a small one, Parker's case is one of the best, and for a fuller one, Reed's case. Both, however, are made of morocco, and like others of that sort, soon lose their comliness, and do not perfectly protect the instruments.

On these accounts, I resolved to have a new case constructed, with a new selection of instruments, such as experience showed to be most convenient. I therefore made drawings and descriptions of a case such as I desired, and requested TIEMAN & Co., of New York, to manufacture and keep them among their stock, which they readily undertook to do.

The material of the case is polished hard rubber, perfectly impervious to water, and having almost the beauty of jet. It is, therefore, extremely durable, and will retain its beauty and polish for indefinite years. In fact, the case will be unimpaired when the instruments are worn out by long use.

It opens on a strong hinge, in two equal valves, exposing all the instruments to view at once, ready to be taken up for use. When closed it is about 5½ inches in length, 2¾ inches in breadth, and ⅛ of an inch in thickness. The ends and all the edges are rounded to prevent wearing the pocket, and the whole appearance is much more beautiful and solid than that of leather and morocco cases.

The selection of instruments is as follows:—

1 Scalpel,
1 Probe pointed bistoury, } both in one handle.
1 Tenotome,
1 Sharp-pointed bistoury, } " " "
1 Gum Lancet,
1 Tenaculum, } " " "
1 Pair of Scissors.
1 Rat-toothed or bulldog forceps.
1 Dressing Forceps.
1 Silver catheter in 4 pieces, which can be combined into a male, or female catheter, as desired.
1 Porte caustique.
1 Silver probe.
1 Silver director.
1 Pocket case saw.
1 Silk, ivory, or wooden card for holding ligature.
6 Suture needles.

I find by experience that this combination is extremely convenient for the following reasons:—The first six instruments, of course, are found in every pocket case having any preten-

sion to completeness, and need no remarks. Of the scissors there is only one pair, and that of the small straight variety. This form is by far the best for general purposes, and the insertion of two or three varieties of scissors into one pocket case is a very inconvenient waste of room. With the straight scissors one can do almost everything required, including even the operations for entropium and strabismus. For forceps, I prefer the small rat-toothed variety, without any lock, but others choose the bulldog form. Either can be put in, but it is not best to fill up the case with both. The dressing forceps, so called, is of the kind resembling polypus forceps. It serves a very valuable purpose, not only in handling dressings, but also in extracting fragments of necrosed bone from deep fistulas. It is also an excellent bullet forceps for pistol balls which have not penetrated very deeply, and has the merit of being able, in cases of impacted balls, to bite out and bring away a small chip of lead, thus settling the question of whether the body seized is really the bullet, or only the edge of a bone. While in the army, I found this to be a very important quality in some difficult diagnoses. It also serves as a very excellent polypus forceps for the removal of polypus nasi.

The compound silver catheter needs no explanation. It is capable of being turned into a male or female instrument as required. It seems not generally known among physicians that with a clean silver catheter and a scalpel or lancet, the operation of tapping can be performed with as much neatness and perfection as with the best trochar.

The pocket case saw is a most important instrument, and yet very seldom seen. The form heretofore made is that of a delicate saw set in a tortoise shell handle, and shutting up like a scalpel. This has three faults. 1st. The blade can be no longer than the handle. 2d. The junction of the saw with the handle is liable to break under hard usage, and thus totally disable the instrument. 3d. The combined thickness of the saw and of the handle causes it to occupy too much room in the case. For these reasons I devised a saw of which the handle and blade are all in one piece of steel, and thin enough to lie

in the case beneath another instrument, thus practically taking up no room. It has thus strength and compactness. With this saw a femur or a humerus can be sawn off without difficulty. Hence in an emergency, by means of this pocket case alone, the surgeon need not hesitate to undertake the amputation of an arm or a thigh. With the scalpel incisions may be made on the circular plan, or, if preferred, flaps can be cut from without inward, as advised by Dr. Prince, of Jacksonville. Practically, however, the pocket case saw comes oftenest into use in fractures for cutting and modifying splints to fit the patient. For this purpose I find it an absolute necessity. It is also available as a metacarpal saw in minor amputations.

The ivory card, which may be made also of wood, shell, or horn, is by far the best implement for holding ligature silk. It keeps it perfectly straight, smooth, and unentangled. It is notched at the extremities, and the silk wound on lengthwise, and the whole held in a loop like any other instrument.

The suture needles, instead of being stuck in a piece of paper or cloth, are neatly deposited in a small box in one valve of the case, and covered with their inside lid. All these instruments are held in position by loops of elastic ribbon, which keep everything securely in place, even if the case is opened and held bottom upwards. The whole inside is lined with velvet, and a fly pocket for containing adhesive strap is attached between the two valves. The price of the whole is about $25, and it may be ordered either of TIEMAN & Co., of New York, or of BLISS & SHARP, Chicago.

ARTICLE X.

CATALYSIS AS A CHEMICAL, PHYSIOLOGICAL, AND PATHOLOGICAL PROCESS.

BY JOHN REID, M.D., of Chicago, Ill.

Communicated to the Chicago Medical Society.

Catalysis is a term used to designate the changes produced among the proximate and elementary principles of a compound,

by virtue of the presence, merely, of a substance which does not of itself enter into combination with them. In ordinary chemical reactions the substances brought together undergo mutual decomposition, and in the new combinations which take place all traces of the original compounds disappear. On the contrary, in catalytic changes, the active agent of the process contributes nothing of its own composition or elements to the substances acted upon; its mere presence being sufficient to induce them. No explanation can, in the present state of our knowledge, be given of the nature of the force thus brought into exercise, and hence, perhaps, the propriety of the designation employed, which simply expresses the action of "presence" in inducing decomposition.

The essential conditions of its action are, first, the presence of a compound substance capable of undergoing change, and second, the contact of a substance capable of exciting or setting those changes in motion. It is not necessary to the idea of catalysis that the catalytic agent should itself remain unchanged. This may or may not occur. Thus, where an inorganic compound, as sulphuric acid, is the catalytic, no alteration takes place in it. On the other hand, when it is an organic principle, in most cases, perhaps in all, changes originating in it, constitute the first and essential part of the process.

The class of phenomena comprehended under this term though obscure, is yet an extensive one, and of common occurrence. It is not limited to any particular set or group of substances. It may be seen in the inorganic kingdom in the action of one inorganic body upon another. Also in the action of an inorganic on an organic substance. It is most abundantly and familiarly developed in the action of azotised substances on each other, and on other organic substances, as in ordinary fermentation and other analogous changes. It also comprehends a large and most important class of vital phenomena, as the digestion of food, and, probably, its ultimate assimilation in the tissues, and the varied metamorphoses occurring there. In various pathological states we witness its direful operation, even in the mildest phases of its action, in contamination and per-

version of the animal fluids, in disturbance of all the functions of life, and in its graver operation a suddenness of dissolution which no other morbid agency can rival.

It will be the object of this paper to show the operation of the catalytic force in the various departments mentioned, with a view to a clearer comprehension of its agency in the induction of what are called zomotic and catalytic diseases.

I will then first glance briefly at its operation among inorganic substances. It is well known to the chemist that oxygen and hydrogen may be kept mixed for any length of time at common temperatures without combination taking place. But on addition of platinum, either finely powdered or in the sheet, combination immediately commences, and water is formed. It is unnecessary to say that the platinum contributes nothing beyond its mere presence to this result. Other metals, as palladium and gold, and even glass, possess the same power, though in inferior degree. Second. If a little finely powdered peroxide of manganese is added to chlorate of potassa, and a gentle heat applied, oxygen will be set free at a far lower temperature than when chlorate of pot. alone is used. All the oxygen comes from the chlorate, which is completely decomposed, while an entirely different substance, the chloride of potassium, is formed. The peroxide of manganese remains entirely unchanged. Many other illustrations might be given of the operation of catalysis among inorganic compounds, but these will be sufficient. I will now proceed to show that inorganic substances not only induce catalysis in others of the same class, but that some of them have the remarkable property of inducing it in organic substances.

Thus, dilute sulph. acid with the aid of moderate heat, converts gelatinous starch into dextrine, a substance having different physical properties, but identical chemical composition. On the application of greater heat, the dextrine is transformed into glucose or grape sugar.

Again, cane sugar in solution with sulph. acid, is rapidly changed into glucose, a substance of different though allied composition, and possessing physical and chemical characteristics of an entirely different kind. Six equivalents of oxygen, and

six of hydrogen, have by decomposition of the water present, been added to the composition of the original substance introduced. In both these experiments, the sulph. acid remains of course unchanged and undiminished.

These transformations are precisely what take place in the digestion of starch and cane sugar in the human body, where the gastric fluids and intestinal juices take the place of the sulph. acid in the experiments with corresponding results.

The action of many of our most valued and potent remedial agents, as mercury, iodine, arsenic, and others, are obvious instances of catalysis. No other remedies produce more decided and positive effects than these, yet they undergo no decomposition in the process, and are cast out unchanged.

The beneficent influence exerted by these agents in many forms of disease, and their equally destructive powers in cases unsuited for their administration, affords a wide and familiar field of observation, and present some of the most striking instances of the catalytic power of inorganic over organic substances.

Facts of this kind have many interesting physiological and pathological bearings, and can hardly with propriety be excluded from our consideration when we remember how largely and intimately inorganic substances enter into the composition of the human body, and the extent to which they may be introduced in the various ingesta and as medicines. Sulphur, we know, forms an essential part in the composition of all the protean substances, being incapable of complete separation from them, without destruction of the organic substance, and most of the various azotised principles which make up the bulk of the human body, are characterized by the presence of various inorganic substances which are essential to their composition. That their presence is essential is proved by their constancy, as well as by the intimacy of their combination, and it cannot be doubted that they take an important part in the metamorphosis of tissue. Whether the influence they exert is by that of ordinary chemical attraction, or that of catalytic power, cannot as yet be positively stated, but that it is by the latter is not an im

probable assumption, in view of the facts which I have stated, and many others which might be presented.

It is, however, among organic substances that the operation of catalytic force is more particularly and familiarly seen. One class of these, the non-azotised, though permanent under ordinary circumstances, are characterized by a special aptitude to undergo decomposition in the presence of a catalytic or ferment. The other, the azotised, are equally characterized by the property they all enjoy in an extraordinary degree, when in process of decay, of exciting these changes in proximate principles and in each other. Hence their designation in reference to these changes of catalytics or ferments. The most familiar illustration of these facts is seen in the process of fermentation. A solution of sugar in water has no tendency to ferment, but on introducing an azotised body, as gluten, the process is immediately set in motion, resulting, as we all know, in the transformation of sugar into alcohol and carbonic acid, the gluten undergoing change, but contributing nothing of its elements to this result.

The substance yeast, usually employed in the fermentation of beer, is dependent for its powers on the gluten it contains. Examined under the microscope, it is found to abound in minute transparent vesicles containing granules, which are believed to be living infusory plants, which have the power, and do actually propagate themselves, at expense of proximate principles in the solution, in which they induce fermentation. We have thus two processes going on side by side in the solution, a change in the ferment which impresses similar changes upon all proximate principles present, assimilating them to its own nature, and decomposition of the sugar, out of the elements of which alcohol and carb. acid are formed.

Fermentation, then, as we have seen, is but a catalytic process. The same conditions are required for its developement, and the results are of the same kind.

The visible extrication of carbonic acid gas occurs in vinous fermentation; but this extrication is not essential to the idea even of fermentation. In the case of acetous fermentation,

although as often conducted, carbonic acid is given off, it is not essential, (fixation of oxygen from the air being the essential change,) and in the improved processes of forming vinegar from alcohol it does not take place.

The conversion of glucose and milk sugar into lactic acid under the action of a ferment, is as true an instance of fermentation as the conversion of cane sugar into alcohol and carb. acid. The state of intestine motion and change which the term fermentation requires is met in the decomposition altered relation of atoms and change of structure which takes place.

The exception, then, which has been taken to zymosis, as a term used to express certain morbid processes which take place in the human body under the operation of a morbid poison, on the basis that fermentation, which the word Zymos is meant to express, requires the evolution of carb. acid, is therefore groundless. Webster defines fermentation as follows:—In its most general sense it may be defined any spontaneous change which takes place in mineral and vegetable substances after life has ceased. And a later authority, Chalmers' Encyclopediæ, says: "Fermentation is a term applied to the change which occurs in the organic substance, when influenced by another in a state of decay." For those who prefer it, the word catalysis may be substituted for zymosis with propriety, although the phenomena of increase of the catalytic agent or morbid poison which takes place in some truly contagious and infectious diseases, as small pox, measles, &c., renders zymosis the preferable term.

Before leaving this part of the subject, we might well challenge those who take exception to the word zymosis on the basis mentioned to show that no carbonic acid is actually evolved in the diseased changes in question. We know this to be the most constant and abundant product of tissue metamorphosis in a state of health, and therefore may, by the fairest deduction, be considered to take place in the quickened metamorphosis of catalytic decomposition.

I have thus diverged from my main subject to answer some objections which stood in the way of a profitable discussion of zymotic diseases at our last meeting. I will now return to the

subject of catalysis as acting among organic substances. It will probably be unnecessary to illustrate the subject farther than has been done under the head of fermentation. I will now consider it as a part of vital phenomena in various physiological processes. An azotised substance called diastase is easily obtained from malt by maceration in lukewarm water, which has remarkable catalytic power over starch, converting it with great rapidity into dextrine and glucose; thus producing the same effects as we have seen result from the presence of sulphuric acid. This substance, diastase, is always found in small quantity in germinating seeds and buds, in the act of development. As the process of germination advances, the starch of the seed disappears, and dextrine and glucose are formed, as is manifest without chemical tests, in the sweet taste of the juices of the young plant, and their gummy feel. Is there not good reason to believe that in this physiological act, the diastase is the active agent of the process, and that it produces these important changes in the constituents of the seed in the same way that it does upon these same constituents elsewhere.

In the saliva of man there is present an azotised substance called ptyaline, upon which the peculiar digestive power of the saliva upon starchy food depends. So energetic is its action that if starch paste, at a temperature of 100° F., is introduced into the mouth, it will yield traces of sugar in half a minute. The admixture of starch and saliva out of the body produces the same effect, and is a true instance of catalysis. But it is in the small intestine that the digestion of starch and sugar especially takes place. Under the action of the intestinal juices, the same series of changes take place which we have seen under the catalytic action of sulph. acid and diastase. The starch is converted into dextrine, the dextrine into glucose, in which state it passes into the circulation. The active agents in inducing these changes are found by experiments both in and out of the body to be the pancreatinim, a peculiar azotised principle of the pancreatic juice, and the peculiar secretion (not yet well analyzed) of the follicles of BRUNNER and LIEBERKUHN: these substances yielding nothing of their own elements to the

new substances formed, evidently act by virtue of their catalytic power.

The process of stomach digestion gives us another remarkable evidence of catalytic transformation. Under the action of the gastric juice, all the albuminoid elements of the food, as albumen, fibrin, musculine, caseine, &c., are without distinction converted into a new substance called albuminose. This substance, while it has the general characters of those of the azotised class in being uncrystalizable and containing nitrogen, has peculiar characters of its own. Unlike albumen, it is not precipitated by nitric acid and heat; and has the property of freely permeating organic membranes, which albumen has not. The process of stomach digestion, then, is not a simple solution of albuminoid substances, but a transformation of them, effected by the gastric juice. This power of transformation does not reside in the acids of the gastric juice, which are found at the temperature of the human body to exercise only a feeble influence, although at the point of ebullition they possess it. The active agent in the process is found in the pepsine, a peculiar azotised substance found in the stomach, which acts the part, even in minute quantities, of a most energetic ferment. So energetic is its action that half a grain of acetate of pepsin dissolved in hydrochloric acid is capable of taking up 210 grains of white of egg, while the acid alone, at the same temperature, had an inappreciable effect. The azotised food being thus reduced to the condition of albuminose, the digestive process is perfected, and in this form it freely permeates the membranes and enters the circulation.

We have thus seen that the various alimentary substances, both of an azotised and non-azotised kind, required for the sustenance of the body, are fitted for appropriation by a process of catalysis. That in each kind of digestion there is provided a special catalytic agent, with special powers over the particular substances subjected to its agency. These and other considerations would naturally lead us to the inference that in the progress of these alimentary substances, thus changed, towards the general circulation, the changes which take place

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in them, and their subsequent metamorphosis in the blood, are the results of a similar process. Here we are no longer able, as in the former ease, to give a positive demonstration of the nature of the changes which occur. We are left more to inferences and deductions, and the convincing power of analogies. These, however, establish, on a tolerably firm basis, that the same force is in exercise in the latter case as in the first. And further, that the whole process of final assimilation in the tissues, and the various metamorphoses occurring there, both of a progressive and retrogressive kind, are referrable to its operation.

It would obviously be impossible in a brief article to enter into anything like a full description of these subjects, even if our knowledge of them warranted it. I will only therefore allude to a few of the least debatable instances of catalytic transformation occurring in the penetralia of the body.

In examining the blood of the portal veins we find its albuminous constituent to exist in the form of albuminose. After emerging from the liver, it is found in the hepatic veins and vena porta ascendeus, no longer as albuminose, but as albumen. This change, according to CARPENTER, has been effected by contact with the tissues of the liver. The catalytic agency of that organ, or some unascertained principle in it in inducing this change, seems evident. A similar catalytic influence is exerted by that organ in the glucose which it receives from the portal vein after the digestion of starchy food. The saccharine principle, entering as glucose, emerges in the hepatic veins as liver sugar, a form of sugar of which the blood is much more tolerant than of any other. Again, the liver is proved to be of itself a sugar-producing organ. It is capable of producing it from albuminoid substances. Of the various decompositions and metamorphoses which culminate in the production of liver sugar from albuminous substances we know nothing, but in the process of its elaboration we do know that a peculiar substance is formed called glycogene, intermediate in composition between dextrine and glucose—the formation of which is one step antecedent to the production of sugar. It does not of itself contain

sugar, but is readily converted into it by contact with any of the animal ferments, as those contained in the saliva, or in the blood. The unavoidable inference in reference to the glucose conveyed to the liver, and converted there into liver sugar, is that it is so converted by a catalytic change similar to that by which cane sugar is converted into glucose by the action of a ferment; and in reference to the glycogene, that it is transformed into sugar in the same manner that dextrine could be transformed under similar conditions.

Both glucose and liver sugar rapidly disappear as such when introduced into the general circulation. LEHMAN and ROBIN consider that it undergoes immediate conversion into lactic acid, a substance of similar composition, and of the existence of which as a normal ingredient of the blood there is now no doubt, in which state these saccharine principles are appropriated to their peculiar purposes in the body. The facility with which these substances are transformed into lactic acid in the presence of azotised compounds out of the body, renders it extremely probable that a similar change is constantly going on under similar influences within it. The albuminous and fatty contents of the lacteals as they pass on to join the general circulation, under the catalytic agency of the vitalized surfaces over which they pass, are gradually prepared for their final destination, and after being subjected to the action of the air in the lungs, are finally mingled with the blood in the general circulation, where by the catalytic action of its ingredients, they are assimilated to its own composition.

Were we able, it would be interesting to follow these nutrient principles to their ultimate destination in the tissues, and mark the process of their transformation there into the vital constituents of the frame. But in these recesses we come into immediate contact with the principle of life itself. We cannot isolate the active agent, but the transformation is apparent, and so far as we see it is strictly catalytic. Each particular tissue or organ attracts to itself that which it requires for its nutrition, and once in contact with it transforms it into its own structure.

Then commences the destructive or retrograde metamorphosis, by which parts which have fulfilled their functions are prepared for expulsion from the body by transformation into effete and excrementatious products. These, under ordinary circumstances, are removed as fast as they are formed by the various excretory processes. If, from any cause, they should accumulate in the blood, serious derangement of the health, and even death, is sure to result. The noxious effects of retained carbonic acid and urea are sufficiently familiar. But independent of the directly poisonous influence which they exert, the retention of excrementitious products have been clearly demonstrated to establish a predisposition to the developement of various acute specific diseases. In proof of this I need only cite the prevalence and malignity of these disorders among persons breathing an "atmosphere charged with carbonic acid, and laden with putrescent emanations." "And the peculiar liability of the parturient female, whose blood is charged with substances in a state of retrograde metamorphosis, to that most fatal zymosis, puerperal fever." The liability of the intemperate, the famished, and the overworked to these diseases, may all be found in the contamination of the blood from the presence of excrementitious products. That these substances, already in a state of change, should be readily and powerfully acted upon by the introduction of an energetic ferment from without, is not at all surprising; or, that without any such introduction, some potent principle might be developed among its azotised constituents which might thus originate *de novo* some similar form of disease.

For the production of a certain class of contagious diseases, as the eruptive fevers, it seems to be well established that two conditions are essential. In the first place, an existing predisposition in the subject, which we call a predisposing cause, and in the second place, the inception of a morbid poison, which constitutes the excitor or exciting cause. If either of these are absent, the specific disease is not induced. These are precisely the conditions required for the production of catalytic action in general. A solution of sugar in water has no tendency to un-

dergo decomposition until the catalytic agent or ferment is introduced. Again, in these contagious diseases, a surprising multiplication of the original morbid poison takes place during their progress. This also has its complete analogy, as we have already seen, in the development of the yeast plant, used to induce fermentation of an infusion of malt. The changes which actually occur in the blood in catalytic diseases furnish the last required analogy to the fermenting process. These are various and striking, but as yet have been but partially elucidated.

Its chemical analysis seems to be attended with peculiar difficulties, so that the least satisfactory of our knowledge of the pathology of disease, is that which concerns the blood.

In general it may be said that in typhoid, putrid, and malignant forms of disease, the fibrine is notably diminished, and also the other solid constituents. In the exanthemata and typhus, the alkaline salts are relatively increased. In the malignant forms, and in cholera, the coagulating power of the blood is much diminished, and sometimes destroyed.

These are not put forward as the peculiar or exclusive results of the operation of catalytic poisons; they are nevertheless results which attend their action. The arrested secretions and altered excretions afford more decided evidences of its perverted condition. The increase of urea, uric acid, hippuric, sulphuric, and phosphoric acids and the pigments, and the occasional presence of unusual products, as leucine and others, in the urine, indicate the presence of these effete matters in the blood in unusual proportions.

The presence of the coloring matters, sometimes in fourfold increase, is especially significant of destructive changes in the blood, being by the best investigators attributed to the disintegration of the blood corpuscles. The peculiar and characteristic emanations from the lungs and skin, and the strangely vitiated and often putrescent discharges from the bowels, all point directly to the blood out of which they are drawn or elaborated, as the primal source of their perversion. The poisonous quality of such blood introduced into the healthy or-

ganism, is better evidence of its perversion than any chemical examination could afford. A new and important sort of evidence of blood contamination in catalytic diseases has been furnished by the experiments of SCHMIDT. "He has discovered that blood drawn from the veins of a healthy man will not cause either sugar, urea, amygdalin nor asparagin to ferment. If the same blood be exposed to the air for a few days, it will occasion fermentation in saccharine matter, and after fourteen days' exposure another principle will be developed capable of causing that change both in urea and asparagin. On the other hand, blood drawn from persons laboring under various diseases of this class, including cholera, induces fermentation in a few hours, not only in sugar and urea, but also in amygdalin." These facts, brought prominently forward by Dr. POLLI, are conclusive as to the alterations in the quality of the blood, and complete the parallel sought to be established between the morbid processes at work in the diseases under consideration, and those of catalytic actions in general, and abundantly justify the designations of catalytic and zymotic, which have been applied to them.

ARTICLE XI.

ANIMAL POISONS AS CAUSES OF DISEASES; INDICATIONS FOR TREATMENT IN DISEASES PRODUCED BY THEM.

BY N. S. DAVIS, M.D., Prof. of Practical and Clinical Medicine.

Remarks made in a Discussion before the Chicago Medical Society, Feb. 19th, 1864.

The question before the Society for discussion this evening, is, what are the indications for treatment in diseases arising from animal poisons? The time allotted to each member, under the rules of the Society, is so limited as to preclude all preliminary remarks in relation to the existence and *modus operandi* of animal poisons, and compels me to proceed directly to the question. Assuming, then, that animal poisons exist capable of producing disease; and that they act through the medium of the

blood, to which they gain access, by absorption from some injured or diseased surface; by inhalation with the air through the lungs; or by retention, through failure of some one of the excretory organs to perform its functions, I will proceed directly to the question. The distinct rational indications for treatment in diseases of the class here supposed, may be stated in four propositions:—

First, To neutralize or antidote the poison, and thereby render it harmless.

Second, To introduce such remedial agents as will retard or altogether stop the SEPTIC or deteriorating influence that most of the animal poisons produce on the constituents of the blood.

Third, To favor, as far as possible, the elimination of the poison through the natural excretory organs.

Fourth, To mitigate or remove the irritating effects of the poison, on the properties and functions of the organized tissues of the body.

If the first of these indications could be fulfilled completely, during the incipient stage of the disease, it would doubtless remedy the whole difficulty, and render the remaining indications unnecessary.

When the poison is being introduced by absorption from wounds or injured parts, as the bites of serpents, rabid animals, &c.; or from erysipelatous, gangrenous, and suppurating surfaces, such a result is sometimes practicable, by the application of the antidote directly to the wounds or diseased surfaces.

The practicability of this has been many times demonstrated by the speedy application of a solution of iodine to the bites of poisonous serpents, and more recently by the local application of bromine, &c., to tissues in a state of gangrene. A variety of facts seem to show conclusively that iodine, chlorine, and bromine are reliable antidotes to many, at least, of the animal poisons, wherever they can be brought fully in contact with them.

But each of them possesses properties of so much activity, when taken internally, that they cannot be safely introduced into the blood in sufficient quantity to act as efficient antidotes

to animal poisons already impregnating the mass of that fluid.

Conceding the fact, then, that we are yet unacquainted with any therapeutic agents what can be safely trusted to antidote animal poisons already in the blood, the second indication named becomes of much practical importance; for if we can introduce into the blood, through absorption from the stomach, any agent or agents, the presence of which will prevent the poison from inducing its special *septic*, or peculiar change, in the quality of the blood and the properties of the tissues, it will sooner or later find an exit from the system through some of the excretory organs, and the convalescence of the patient will have been secured. It is unquestionably true that most of the animal poisons produce their violent and dangerous effects, by primarily acting on the constituents of the blood and properties of tissues in such a way as to effect a more or less rapid increase of themselves. Thus the most minute atom of variolous poison, introduced into the system, either by inoculations or inhalation, produces no perceptible disturbance for several days, when it is found to have so multiplied as to furnish deposits in the whole cutaneous surface, and even to impregnate the surrounding air to a certain extent. So, too, in the absorption of pus or putrid animal matter from an unhealthy suppurating surface, or from phlebitic inflammation, the minute quantity thus absorbed becomes rapidly multiplied until a general state of pyœmia is induced and puruloid deposits are found in various parts of the system, with a rapid exhaustion of the patient.

It is this change in the elements of the blood and the properties of the tissues that constitutes the *septic* or zymotic action of animal poisons. To prevent or arrest this action, so as to avoid the multiplication of the poison in the system, constitutes the second indication for treatment, as already mentioned. The remedies that have long been used for fulfilling this indication, though without a very definite idea of their *modus operandi*, are the mineral acids; the preparations of Peruvian bark; and the chlorine salts, more especially, the acid tincture of chloride of iron. More recently the experiments of Dr. Polli, in Europe, showing the efficiency of the sulphites of lime

and soda, in preventing the injurious effects of pus and putrid animal matter when introduced into the blood of animals, has caused those substances to be used as remedies in a variety of diseases supposed to depend on blood poisoning. From my own experience thus far, I am led to believe they will be found to possess great value under certain circumstances. But it will be chiefly as *anti-septics*, in preventing the action of such animal poisons as are derived from the decomposition of animal matter; and to be effectual they must be administered sufficiently early to be present in the blood coincidently with, or very soon after, the introduction of the poison. It will be remembered, that Dr. POLLI, in some of his most striking experiments, administered the sulphites to the animals long enough to have them absorbed, before the poisonous matter was injected into the veins. And we are inclined to think that these substances will be found of very great value, whenever they can be administered sufficiently early to be present in the blood, before the poison has commenced its deteriorating effects on that fluid. For this purpose their administration should be commenced, whenever possible, during the incubative stage of such diseases as arise from the action of animal poisons. The quantity given should be sufficient to impregnate the fluids of the body freely, and the administration should be continued until all direct action of the poison ceases. It is highly probable that future experiments and observations will show that the action of the sulphites is most efficient against that class of animal poisons which arise chiefly from the decomposition of animal matter, and gives rise to erysipelas, phlebitis, and pyemia. Some have objected to the use of the sulphites, and all other remedies founded on the indication now under discussion, on the ground that the indication itself involves a humoral pathology, analagous to the ancient doctrines of concoction and fermentation; processes which they claim cannot take place in the living system. We see no force in the objection. For if we admit the absorption of an animal poison, it makes no practical difference in the indication for treatment, whether the poison produces its deteriorating effect by acting *directly* on the com-

position and properties of the blood, or *indirectly*, by first changing the vital properties of the solids, and through them affecting the quality of the fluids. Some of the remedies that have long been used in the class of diseases under consideration, such as the tincture of the choride of iron, undoubtedly act more or less on the vital affinity of the organized structures, and not merely by diminishing the alkalinity of the blood as many suppose.

The third indication we have named, is founded on the fact, that nearly all poisons manifest an affinity for some one or more of the exeretory structures or tissues through which they are ultimately eliminated, if life is preserved, and no antidotes are successfully administered. Thus, the contagions giving rise to the class of eruptive fevers, all manifest a strong affinity for the cutaneous tissue, in which they find a lodgement, induce specific inflammation, and from which they are finally eliminated. Whenever such a tendency can be discovered, it is obviously desirable, not only to carefully avoid such remedies as would interfere with the natural tendency of the poison, by producing active determinations in an opposite direction, but to use such as will gently promote the action of the organs most likely to eliminate the morbific agent. This rule would forbid the use of active cathartics and depletives in the early stage of all eruptive fevers, and clinical experience has fully demonstrated their inutility.

The fourth and last indication, calls for the use of such means as are calculated to allay the general excitement, and mitigate the extent and severity of local complications. If either one of the three preceding indications could be early and perfectly fulfilled, this last would be rendered unnecessary in most instances. But in the present state of our knowledge, this can seldom be done; and hence to mitigate the effects of a poison that he can neither completely antidote nor expel from the system, often becomes the paramount duty of the practitioner at the bedside. Of course, the remedies for this purpose, will be as variable as the effects to be treated. In some cases the active grade of excitement will call for sedatives and alterants; while

in others stimulants, anodynes, and tonics may be required. Of course no individual remedies can be enumerated under this head, without entering into the details of each individual case that might be presented to the practitioner.

ARTICLE XII.

SANITARY REPORT OF THE WEST DIVISION OF THE CITY OF CHICAGO.

By HIRAM WANZER, M.D., of Chicago, Ill.

Read before the Chicago Medical Society, Friday Evening, Feb. 26, 1864.

MR. PRESIDENT AND GENTLEMEN:—Having been appointed to make a Sanitary report of the West Division of our city, should I wait longer, I should not be better prepared, probably, than at present. The writing a Sanitary Report of the condition of our city, calls for a more extensive experience and more time than I have had to devote to it.

During the last quarter there have been a marked increase in some diseases, especially those classed as zymotic. Small-pox, of the milder form, has abounded more than any other disease of the class. During the month of January last, the deaths from small-pox reported were 55; the month previous 23. Showing how the mortality increases by cold weather, in my opinion the majority of cases were of the milder variety, and have recovered without much medication, never coming under the observation of the physician. I believe the pathology and treatment of small-pox is not well understood by many of our respectable practicing physicians, and can only be learned by practical observation at the bedside. As far as I am acquainted successful vaccination has been a safeguard against the disease in most instances. Chicken-pox has prevailed somewhat extensively, and in some instances has been mistaken for small-pox, which has increased the panic. A few cases of scarlatina and measles have been noticed. The treatment has been expectant, and the cases have done well. In my opinion there is generally

too much interference in these cases. Erysipelas, both idiopathic and traumatic, has prevailed somewhat extensively, but the latter variety has come more under my observation. I have had three cases that terminated almost in exhausting suppuration. They all required operative proceedure. I gave a brief synopsis of those cases to the Society, but am now better prepared to give definite results.

The first case followed an injury received at the mechanical bakery. The hand and fore-arm were caught between iron rollers, and remained there three-fourths of an hour. The soft parts of the hand and fore-arm to near the elbow, save the muscular structures, were reduced to a pulp. In a few hours erysipelas, of an intense grade, followed in the wound and in the structures of the arm to the shoulder. Upon its subsidence, gangrene followed, involving all the lacerated tissue, and the sound integument to the shoulder. It became necessary for me to strip the hand and fore arm, both anteriorly and posteriorly, of all the mortified tissue, down to the muscles, tying arteries as I went. The symptoms in this case were typhoid, and the treatment from the beginning strongly supporting. I applied, locally, equal parts tinct. ferri muriatis, and strong tinct. iodine. Diet was strong beef-tea, well salted; iron and the sulphites, were also given. A part of our success may be ascribed to the latter remedy, as there become soon an amelioration in his symptoms after its use. The patient made a fair recovery, and has gone to New York to his parents.

The second case I reported went on to suppuration. An enormous quantity of matter was imprisoned beneath the integument and fascia of the foot and leg to the knee. A large incision set free an accumulation of most unhealthy pus—and he entered immediately upon convalescence.

The third and last case of traumatic erysipelas, I believe, we are now fully prepared to report. The soldier had received a shot from a pistol. The ball entered the upper third of the thigh, probably striking the great trochanter of the femur. Glancing from there I traced it several inches down the thigh beneath the fascia lata, and over the rectus muscle, when it was

lost. No further attempt was made at finding it. Alarming eryspelatous inflammation followed speedily in the thigh, which eventuated in suppuration beneath the integument and fascia lata. The thigh become enormously swollen, and for days he would not allow me to open it, until the distension become so great that he could not endure it any longer. I made an incision four inches long, through the integument and fascia lata; an enormous quantity, it would seem a gallon, of most unhealthy pus escaped. Death, no doubt, would have followed in either of the cases mentioned before the matter would have found an external opening spontaneously. The idea is now fully established in my mind, that early, bold incisions are the only hope for our patients in such cases; for pus will hardly find its way through superficial and deep fascia in time to prevent a fatal degree of exhaustion.

We will not forget another pathological condition equally significant. There is a most poisonous agent to be absorbed into the blood. In suppuration from erysipelas cases, the pus, in consequence of its excessive alkalinity, saponifies and partly discolors the fatty tissue. The cellular tissue is broken down and escapes the wound with the adipose in the form of strings and shreds. A large handful escaped the wound a few hours after I made the incision in the last case mentioned. The direct operation in all these erysipelas cases is depressing, with marked prostration of the vital powers. The reabsorption of this poison causes early decomposition of the blood. The patient soon wears the livery of asthenia. Its presence is no less active in the rapid disintegration of the solid structures of the body, following more, in my experience, injuries, surgical operations, extreme privations, or excesses. The therapeutical indications in counteracting the effects of this zymotic agent, have been met by me with two classes of remedies. Antiseptics as the chlorides, and charcoal to operate from without. Strongly concentrated nutrient diet; tonics, especially of the ferruginous class, and the sulphite of lime to operate within. The symptoms in the last case were typhoid from the beginning. The blood had been rendered aplastic by previous dissipation. Traumatic de-

lirium and coliquitive diarrhœa became two grave symptoms. Stimulants met the first indication, and the turpentine and laudanum emulsion the second. As soon as these symptoms were overcome, the muriated tinct. iron and the sulphites were given. The patient is convalescent.

We predicted in our last report, if changes were not soon wrought in the Sanitary condition of the river, and in our streets and alleys, there would be an augmentation of typhoid fever, as there was then but few cases, and there would be others of an adynamic and zymotic character. Our predictions have been verified, and well known to all the members of the Society. Fevers of the bilious remittent, intermittent, and typhoid type have prevailed; the latter to quite an extent this winter. Some cases have terminated fatally. They have all required, after suitable preparation of the system, quinine frequently, stimulants, and supporting treatment. There have been a number of cases of puerperal fever; some have been fatal. One physician told me he had been called to three cases in consultation, and all had died. Peritonitis and metro-peritonitis, I think, have been quite frequent, generally occurring after parturition. My treatment has been cathartics, anodynes, local synapisms to the abdomen, followed by fomentations of hops.

More cases of uterine disease have come under my observation than previously. The general symptoms are pain in the head, back, loins, and radiating down the thighs, general lassitude and debility. Upon examination, in the majority of cases, there is inflammation, and sometimes ulceration and granulation of the os and cervex uteri. In those cases there is often profuse leucorrhea, with disordered menstruation. My treatment has been local and constitutional. As an internal remedy, I use frequently the elixir calysaya ferratum, prepared by Sargent. As a local remedy I rely principally upon the nitrate of silver. I find the treatment much facilitated by daily vaginal injections of a saturated solution of alum. At the menstrual epoch, all local remedies are suspended, but continue the iron.

Two cases of retroversion of the uterus have come under my observation. The symptoms of each were nearly identical.

They complained of severe periodical pains in the lumbar region and small of the back. Anodynes had no effect excepting transitory in relieving the paroxysms. Upon a digital examination, I found the os patulous, and pointing to the symphisis pubis. The fundus of the uterus was retroverted upon the hollow of the sacrum, impinging much upon the rectum. The fundus was much hypertrophied, and unduly exalted in sensibility. My manipulations caused intense suffering. I reposited the organs, by pressure with the finger, within the rectum upon the fundus. This was all the interference necessary. Several cases of freezing have come under my observation, two of which terminated fatally; reaction in one was never established. In the other there was a hyper-reaction, delirium, and death. I believe nearly all the fatal cases could be traced to a too liberal use of some alcoholic stimulants. The fact, in my mind, is established that they all impair the calorific process; that the system can bear up longer under extreme low temperature without them than with them. Will the Society explain to me the pathology of freezing? Is its action chemical only? By destroying the endangium and all the essential properties, does the heart cease to respond to its stimuli? Are the springs of life frozen, or is its action primarily upon the the solid textures of the body?

Several cases of scurvy have come under my observation. They have all occurred among the poorly-clad and illy-fed of our city. My treatment has been fresh vegetable diet, lemon juice, and the sub-acid fruits, where circumstances would admit of their being procured. I ordered, before each meal, acid aromat. sulphuric; also warm ablutions to the skin.

Croup and convulsions have been frequent among children. I have had but little experience in the former. In the latter, have used chloroform, preceded by the hot bath, always with success.

There have been many cases of bronchitis, pneumonia, and pleuro-pneumonia, and congestion of the lungs. Several cases of the latter have terminated fatally. Tubercular consumption has abounded far more this year than last. There

was an increase of twenty deaths this past January over last year's. I ascribe the cause to the exceeding low temperature, on the poorly-protected of our city. Much has been done in the milder form of this disease to alleviate and stay its onward march, but in the advanced tubercular variety, that healing cordial we have yet to find.

There have been a number of cases of diphtheria. They were all of the asthenic variety, having the well-marked aplastic exudation, and all required strongly supporting treatment.

More severe cases of surgery have come under my observation than heretofore. One interesting case of fracture of the lower jaw, treated successfully by silver wires passed around many of the teeth. The case made a good recovery by this method. The fracture was transverse at the symphisis, and at the ramus of the jaw. I have had a number of cases of compound comminuted fracture of the limbs. They were principally railroad accidents, and required amputation.

Selections.

ON THE THERAPEUTICAL APPLICATIONS OF THE SOLUTION OF THE PERMANGANATE OF POTASH, AND OF OZONE.

By SAMUEL JACKSON, M.D., Emeritus Prof. of the Institutes of Medicine in the University of Pennsylvania.

In looking over, last spring, Bouchardat's *Annuaire de Therapeutique, &c.*, for 1863, I met with the statement "*L'eau ozonisee anglaise est une dissolution de permanganate de potasse* 2, *eau* 1000," p. 95 (that the ozonized water of the English is a solution of the permanganate of potassa, in the proportion of two parts to 1000 of water).

Pincus an others had already established the disinfecting and deodorizing properties of the solution of this salt. These notices suggested to me the thought of testing its therapeutic actions and practical application. My observations were com-

menced in April; but confined to my office, my investigations were, of course, limited.

Having prepared the solution according to the above formula, I proceeded to ascertain its sensible properties on myself. It had no proper taste, but gave a sensation of coolness in the mouth, leaving behind a slight styptic feeling and dryness, which continued for an hour or more. Taken in the dose of a teaspoonful, slightly diluted, three times a day, it produced no prominent symptoms. It caused no inconvenience; there was some increase of appetite, which, however, was good, and an easier digestion. A diuretic action was obvious; there was no general excitement, increase of temperature, or frequency of pulse. A few days after I prescribed the solution in a case of dyspepsia, attended with loss of appetite, disordered digestion, and extreme lassitude. A teaspoonful in half a wineglass of water was directed to be taken four times a day. In a few days the patient called to report a complete recovery.

Four cases of a similar character were treated in the same manner, with a prompt and successful result.

In only one slight surgical case have I been able to test its effects. It was a foul ulcer of moderate size on the left leg, the veins being varicose. The solution was given internally, and directed to be used as a wash several times a day, walking to be avoided as much as possible, and the leg to be kept up. In a week the patient presented himself, the ulcer healthy, rapidly cicatrizing, and his appetite and digestion restored, with improved health.

The following case is of a more decided character. A young medical friend living in the country called to consult me respecting his health. He presented a complete cachectic aspect. His skin dry and cool, face pallid, no appetite, irregular digestion, very feeble, with eczema of hands, feet, and slightly on the face. I mentioned to him my experience and that of my friend Dr. F. Hinkley, Assistant-Surgeon U.S.A., at Campbell Hospital, Washington (to be noticed immediately), and asked him to give the solution of the permanganate of potash a trial. The following extracts from a letter received about a week after, gives the following results:—"A week or more has elapsed since I commenced taking the medicine you gave me, and so far as my appetite and strength are concerned, I know it has done me much good, and I shall continue to take it and give it a fair trial; it has aided my digestion and given tone to my stomach. The quantity of my blood appears to have been increased and its quality improved."

In answer to a suggestion I made in a letter to him, that he was probably too hasty in his conclusions, as the last effects mentioned could hardly have been produced in so short a time, and the facts would be better than inferences, he states, "My observations were based on the following facts, whether the time be short or long:"—

"My cheeks had more *color* in them than ever before, for, if you recollect, I have a pale-looking countenance usually. At the time of writing to you, I began to appear plethoric, and felt remarkably well for *me*, whereas, before I took the medicine I was anæmic. From the above facts, I was led to assert that it improved the quality and quantity of the blood. In regard to my present state of health, the eruption on my hands and face has almost disappeared, on which I have used the solution as a wash twice a day; but my feet, on which I have not used it, are in the same condition as they were originally, no change. Other symptoms about as they were when I wrote you first."

The following case has special interest. A gentleman advanced in life, had been affected last spring with a persistent sense of burning in the urethra, without discharge or apparent inflammation. He was under treatment by Dr. M. M. Levis, who brought him to my office. After six or seven weeks he was relieved. In September he noticed increased secretion of urine, which compelled him to rise several times in the night. In the beginning of October he called on Dr. Levis, who examined the urine. The specific gravity was 1036; it was found to contain mucus in considerable quantity. October 12th, a consultation was held at my office, when I suggested a trial with the solution of the permanganate of potassa. This was adopted, and no other remedy employed. November 5th, the Dr. called and informed me that a complete cure had been effected. The urine had gradually diminished in quantity, and was at that time entirely normal in character.

The following statement of the weekly examination of the urine was given to me by Dr. Levis:—

	Specific gravity.	Quantity in night.	Mucus.
Oct. 12 . .	1036	3½ pints	Large amount.
" 19 . .	1033	2 pints	Less amount.
" 26 . .	1026	1½ pint	Still less.
Nov. 4 . .	1023	1 pint	A trace.

This gentleman has since made a journey of several hundreds of miles without inconvenience or any return of the affection.

The above are the results of my own observations of the

therapeutic action of this remedy. But the most remarkable and almost marvellous effects are its prompt, in most cases, its immediate action in the treatment of gangrenous wounds in the Campbell Hospital in Washington. and the United States Jarvis Hospital, Baltimore.

On the 19th of May, my young friend, Dr. F. Hinkle, of Marietta, Pa., called on me in passing through the city. He informed me he, was Acting Assist-Surgeon U.S.A., and was then stationed at Campbell Hospital, Washington. In the course of conversation on his medical and surgical experience, he mentioned the number of cases of gangrenous wounds, particularly in the wounded at the battle of Fredericksburg, the difficulty of treating them, and the ill success of the treatmnnt pursued. I informed him at once of the observations I had been making with the solution of the permanganate of potassa, and proposed to him to give it a trial. Having a conviction that ozone existed in the solution, I was strongly impressed with the belief that it would be found adapted to such cases. The Dr. at once acceded to my proposition, and obtained the salt at Mr. Blair's on leaving my office.

On the 25th of May I received a letter from him of date 24th, in which he informs me that "in reference to the treatment of hospital gangrenous wounds and gangrene, it has already proved beyond all description efficacious. In the action of the remedy you proposed I find more than I expected, and almost all I could wish. I now give you a prominent case as an illustration of its valuable effects and the instant change produced by its local application and its internal administration, upon the general character of the whole case:—

"The description of the case will be limited merely to the immediate action of the solution on the gangrenous wound. Michael Hoyau, Sergeant, Co. D, 11th Regt., Mass., aged 35; wounded May 3d, 1863, at the battle of Fredericksburg; admitted to hospital May 8. An extensive gunshot flesh wound had been received at the upper fourth of tibia and fibula of the right leg. The integuments for the space of four inches in length and three in breadth, had sloughed from gangrene, leaving at this date, May 23, the tibia exposed for three inches. The whole of the leg and up to the middle half of the thigh is infiltrated with a putrid sanious liquid and pus. The discharge is nearly a quart per diem.

"The left thigh had been penetrated by a minie ball at the commencement of the popliteal space. A considerable amount of fluid had gravitated back of the knee-joint, which was a

source of great suffering. This was relieved by a counter opening giving a free discharge of the fluid. The treatment was commenced May 23, 7 A.M., at which time the situation of the patient was very critical. Pulse was thread-like and 96. Face pallid with anxious expression; head covered with cool sweat. The general temperature below the natural standard; had slept five hours in the last twenty-four. The gangrenous surface looked badly, had a dark green aspect and flabby, exuding a sanious liquid mixed with debris of dead tissues. The odor was pungent and highly offensive. The whole leg and thigh appeared as though melting into this fluid.

"The following treatment was adopted according to your suggestion:—℞.—Per mang. potassa ℥j, acid. sulph. gtt. xx, aq. comm. Oij.—M. A teaspoonful was given every three hours in a wineglass of water. The gangrenous parts were washed with the solution externally and internally, and charpie soaked in it was kept continually applied, being changed as often as the dressing became saturated with the discharge, or, when that was checked, when it became dry.

"The effects on the gangrenous tissues were instant. The flabby, sloughing and indolent surface immediately dried up, and in a few minutes presented the appearance of a wound to which a solution of nitrate of silver has been applied; or that of a delicate eschar from a slight burn, yet it gave no sensation of pain. In three hours the odor was greatly lessened, and in less than 24 hours it was barely to be perceived.

"In at least fifteen other cases of gangrene, such as of stumps of limbs, etc., its actions was no less efficacious."

The Doctor concludes:—"I am already assured that it (the solution of permang. potass) is of the greatest value in cases as above mentioned."

I received from the Doctor a communication inclosing the history of ten cases of gangrenous wounds treated in Jarvis United States Hospital, Baltimore, with the solution, and in all the gangrene was promptly arrested. He also describes the mode of application which he has found the most useful from his extended experience.

He also informs me that he is making out a report to the Surgeon-General on the permanganate of potassa and its uses. In this he will give the history of the numerous cases—I believe now nearly one hundred—of different affections in which he has employed it. A duplicate, he states, will most probably be published in the *Medical Times*, to which I refer for a full confirmation of what I predicted, from my limited experience respecting

the therapeutic action of the solution of the permanganate of potash. I have a strong conviction that science has acquired in this agent a remedy of active powers, of extensive application, easily procured at a small cost, and which can be used without apprehension of risks to be incurred.

From the decided therapeutic action obtained by the practical employment of this solution, especially in the United States Hospitals by Surgeon Hinkle, it became a matter of interest to ascertain its active principles. With this view I tested it for ozone. I had prepared Scoutetten's ozonometric starch and papers. The following is his formula:—

Distilled water	100 gram.
Finely-powdered starch	10 do.
Iodide potassium	1 do.

The iodide of potassium is to be dissolved in the distilled water, and the starch powder is to be mixed in the liquid; when the mixture is finished it is to be placed in a porcelain capsule over a gentle fire, and constantly stirred with a glass rod until it assumes the pasty consistence of the domestic starch. This may be spread on paper; common letter or writing paper is to be preferred. It is then to be cut into bands and kept in a bottle or box.

I employed at first the recently prepared starch. Small portions were placed on a porcelain capsule and a few drops of the solution mixed with the test. A beautiful blue color was instantly developed, after a few minutes passing into a deep black. It compared with No. 10 the highest figure of the ozonometric scale. As ozone obtained by the usual process is not very soluble in water, olny about 6 per cent, and does not produce it reaction as rapidly or as decidedly as the permanganate solution, this last must contain a much larger proportion than could heretofore have been employed. Another difficulty was that the former solution was not permanent; it seldom retained its properties over forty-eight hours. In the first trials made I added a few drops of sulphuric acid to keep up a gentle chemical action by which ozone is generated. But this was soon found to be unnecessary, as I ascertained that the permanganate solution exposed for three to four weeks in a capsule to the air lost but little of its power on the ozonometric test.

A short account of the present state of our knowledge of oxygen and its modified or allotropic states is indispensable for the understanding of the mode of action of the solution of the permanganate. In 1842, Schœnbein discovered what he at first

supposed was a new elementary body, which from its odor he named ozone. Fremy and Becquere, demonstrated it to be oxygen, the properties of which were highly intensified. This view was generally adopted. Schœnbein, from his investigations, ascertained that peroxide of HO^2 could not be produced from either oxygen or ozone, and he assumed hypothetically that there must exist another body in relation to ozone, which he named antozone. They are noted by the symbols $\overset{ox}{\bigcirc}$ $\overset{oz}{\ominus}$ $\overset{ant}{\oplus}$. These facts confirm the views of Mr. Faraday, that oxygen is an allotropic body, capable, like carbon, sulphur, and phosphorus, of taking on modified states, differing in their physical and chemical properties.

"The most important distinctive property of antozone $\oplus$," Schœnbein states, "is the readiness with which it unites to water, to form the peroxide of hydrogen." Ozone exists in the gaseous state, and is always existing in varying quantities in the atmosphere; it is also held in solution by water. It is formed over the surface of water, whether the immense extent of the ocean, lakes, or rivers. It is resolved or converted into passive oxygen by the various oxidizing actions it effects on effluvias, and other contaminations of the atmospheric air. It is also the active agent in bleaching and in chemical actions of the animal organism, oxygen being changed into ozone by the chemical actions in constant activity in the pulmonary tissues and capillaries during respiration.

Schœnbein was desirous to obtain antozone in an insulated or free state. With this object, he directed his attention to the set of peroxides, which he named antozonides, expecting to eliminate from them that kind or part of oxygen, he supposed to be $\oplus$ antozone. As a general result, he found "that whenever ozone $\ominus$ makes its appearance $\oplus$ antozone and its equivalent, HO—$\oplus$, are present. The rule applies also to a number of organic substances, and occurs during the electrolysis of water, never ozone without the peroxide of hydrogen, or antozonic water HO+$\oplus$."

After many unsuccessful attempts, he has obtained his object in a most unlooked-for mode, which he communicated in a letter to Mr. Faraday. A dark blue fluor spar has been long known to German mineralogists. It is remarkable by its property of yielding a peculiar and disagreeable smell when triturated. The nature and cause of this odor had never been settled. The spar occurs in a vein of granite. "A German chemist sent a specimen of it" to M. Schœnbein, "asking him to try his luck

in ascertaining the nature of this smelling matter." In this attempt, he showed and proved it to be the antipode to ⊖, ozone imprisoned for thousands of years, waiting for some one to recognize and set it free. Surprising as it may seem to you, and unique as the fact certainly is, that odorous matter is my insulated antozone, which had so long baffled his researches. "How that subtle matter got into the spar, I cannot tell." *

With these facts before us, there can be but little doubt as to the composition and active principles of the solution of the permanganate of potash. Besides the salt, ozone, or active oxygen, and the peroxide of hydrogen, or, as it ought to be designated, antozonic water, HO+⊕, are also present. The last two are bodies endowed with most active chemical properties, which are brought into action on the decomposing organic structure in gangrenous wounds. The disorganizing process is arrested, the organic or vital actions of the surrounding tissues, reduced to the lowest ebb, are roused into activity, and the fluids are renovated by the exciting and oxygenating properties of ozone and oxygenated or antozonic water. The essential conditions of vital organizing reaction are in this mode locally renewed, and a healing process established.

Taken internally, it enters the blood, and excites the molecular or chemical action of that fluid—an indispensable condition of life. The cessation of those actions is immediate death—it is the mode by which carbonic oxide occasions nearly instant death. These exciting agents, it is most probable, produce also arterial tension, now demonstrated to be the regulator of the capillary or nutritive and vital circulation.

We have the evidence of Gorup Besanez that ozone exerts a kindred action on organic substances. Albumen and casein are changed into products similar to those effected by digestion. Fibrin, it is stated, resisted its action. Should this fact be confirmed, it would show some special chemical distinction between it and albumen, contrary to the observations of M. Cl. Bernard and other physiologists, who regard them as mere transient states of the same substances mutually passing into each other. It had little or no action on urea, allantoin, kreatin, sugar of milk, and hippuric acid—bodies of more stable composition. Bile absorbed ozone and lost its color; its mucus was decomposed.

As bromine has been found very successful by Dr. Goldsmith and some of our surgeons, in the treatment of gangrenous wounds, it occurred to me that probably its solution in water

* Philosophical Magazine, 4th series, Vol. XXI., p. 88.

might develop ozone and antozone similar to the permanganate of potash. I procured a solution of gr. xv to ℥ij of water. With the ozone test it instantly struck a fine blue color, which in a few minutes became of a deep black. From the volatility of bromine great care is required to preserve it for any length of time. The above proportion of bromine is far too strong for internal use. A formula proposed by Ozanam in 1860, makes a preparation that is permanent, and may be employed internally. It is as follows:—

Bromine, pure . . .	10 centigram.	2 drops.
Bromide of potassium . .	10 do.	
Distilled water . . .	100 gram.	

M.

This solution gives a deep blue with the ozone test, which soon passes into black.

From the similarity between bromine and chlorine, I was led to test the latter with the ozone test. A drachm of chloride of lime was put into a pint bottle and a few drops of sulphuric acid aided; in a few moments the bottle was filled with chlorine. A dried test paper was then introduced; it assumed in a few moments a bluff color; when the paper was moistenedit instantly changed into the blue color, which soon became black. When the moist paper was introduced these changes took place in the shortest period.

The test paper acted on by the solutions of permanganate of potash, bromine, and chlorine exhibited equal intensity of color; they could not be distinguished.

These facts appear to indicate ozone or antozone as the active principle of the solution of bromine as well as of the permanganate of potash and chlorine.

ON THE CONSTITUTION AND SOURCE OF THE BILE.

By THOMAS ANTISELL, Surgeon U.S.V., Professor of Physiology and Mil. Surgery in the Medical Department of Georgetown College, D.C.

During the autumn of the last year and the past spring, having had the opportunity of making *post mortem* examinations of patients who had died of what is commonly known as chronic diarrhœa, and finding the gall-bladder (as might be expected in such subjects) distended with bile, it appeared to me that the application of dialysis to this liquid might determine something

new regarding either its constitution or uses, and go to settle some of the obscure and doubtful points in its natural history. It must be admitted that this mode of dialysis has much to recommend it as a means of investigation of animal liquids, for it permits of the examination of the animal fluid while yet in a fresh state, and by using the microscope in connection, enables us to observe the substance itself by the eye, and recognize the form. Nothing is more satisfactory than the appearances of chloride of sodium and phosphates of potass or soda, of glycocholate of soda and hæmatoidin, of cholesterine, nucleating cell and epithelium.

The mode of examination was to place the outer liquid in a quinine bottle, and suspend the cleaned gall-bladder by a wire hung from a cork with which the bottle is closed. The bladder holding the bile was allowed to remain in the liquid 30 to 48 hours, at a temperature of 70°, then taken out, wiped dry on the outside, and placed in another vessel similarly fitted up, containing a second liquid; from this, after 30 hours, it was again removed, wiped, and placed in a third, and subsequently in a fourth liquid. I have used alcohol (86 per cent), ether, chloroform, and coal oil as the fluids best adapted. In this way, by suspensions for periods varying from 24 to 48 hours, I have separated all of the component principles in the supernatant bile (when it is allowed to rest), except the mass of epithelium, granular corpuscles, and mucous corpuscles, which do not osmose into alcohol.

The alcoholic liquid, after dialysis of a few hours, assumes an amber-yellow color, which sometimes deepens to a brown if the amorphous coloring matter of the bile be abundant. The ether and chloroform liquids are usually of a yellow-green tint, from the amount of yellow coloring matter held in suspension.

The ethereal liquid contained yellow pigment granules in great abundance, with some fatty globules, margarate soda, mucous corpuscles, and a few crystals of hæmatoidin.

When alcohol is used as the first liquid, the great portion of the liquid fatty matter passes into it, and if fresh alcohol be used to replace that deeply colored, almost the whole of the fat globules may be removed; in this way, separation between the pigment cells and fat globules may, to a great extent, be accomplished. As the bile is a fluid easily decomposed by exposure to air, the ordinary experimental dialyzer of parchment paper was not employed, the gall-bladder allows permeation to proceed in a very rapid manner, and to a considerable extent, and by its use the transfer of the liquid is avoided, the change from

the condition when removed from the body a few hours after death is very slight. I therefore used the bladder without any transfer of its contents. I may state here that in the examination of the dialyzed liquids, oxidation is likely to occur, but this may be greatly, if not wholly, prevented, by the addition of creasote to the liquids. I have in this way preserved these liquids for three weeks in the *statu quo* they were in at the commencement of the experiment. Creasote has been recommended by Dr. Beale for this purpose in the examinations of the urine. I recommend it in all examinations of bile.

Having mentioned so much of the mode of examination, I will as briefly as possible state the results under the various heads of investigation.

Quantity of Bile in Gall-Bladder.—In ten specimens examined the greatest amount was 28 drachms, and the least 4 (four) drachms; six were above 12 drachms. Those which distended the gall-bladder the most had an unusual amount of common salt present.

Density.—Varied from 1020 in least amount to 1010 in that amounting to 3½ oz. As the bile is a very heterogeneous liquid, containing matters in solution and in suspension, the specific gravity gives no real information of the true disposition and mode of escape of the solid matter. When fresh bile is allowed to stand for six hours it separates into two portions—a clear, dark yellow-green liquid, and a substratum of a deep yellow tint and syrupy consistence; by separating these two layers by decantation and evaporation of both in a water bath until no further loss is appreciable, an approximate result of the relative anount of solid matter in each stratum may be obtained. I examined, in this manner, the bile amounting to 28 drachms:—

The solid matters in supernatant fluid = 6.25 per cent.
" " in syrupy substratum = 4.15 "

Total solid matters in bile = 10.40 "

Constitution of these Liquids.—The two strata alluded to yielded very different results when examined. The clear fluid has a simple composition, faintly alkaline, albumen in solution not precipitable by heat alone, but by the addition of nitric acid along with or after being boiled; the liquid becomes pinkish when heated; it contains all the soluble salts of the bile. The lower stratum contained all the organic and organized substances mentioned further on. Columnar epithelium is the only substance common to both strata.

Proximate Elements of Bile.—The results of repeated examinations of these specimens, fluid and deposit, both under the microscope, as well as by chemical tests, has led to the following list of substances being observed as constituents:—

1. Epithelium.
2. Mucous Corpuscles.
3. Pigment Cells, yellow or greenish.
4. Brown coloring matter, resinoid and amorphous.
5. Cholesterin.
6. Fatty Globules.
7. Common Salt.
8. Carbonic and Phosphate Soda (neutral) and Potass.
9. Glycocholate Soda.
10. Margarate Soda.
11. Hæmatoidin.
12. Hippuric Acid.
13. Albumen.

It was not, of course, possible to determine the presence of all these in each specimen at first, as very many of the substances, from eight to twelve, exist in very different quantity, and if not looked for closely are apt to escape observation altogether. Under the microscope what is usually seen at first are the two varieties of pigmentary matter, the cholesterin and fat globules; the common salt will be found round the margins of the drop under observation, as beautiful Maltese crosses or dagger forms in the natural fluid; in the alcoholic extract the dodecahedron and cube forms of salt are very common.

Cholesterin and Fats.—The alcoholic liquid contains some epithelium and mucous corpuscles and abundant fatty globules. The latter is the chief constituent in alcohol. When this liquid stands over one day crystals of cholesterin appear; these are not regular in form, having the angles wanting; regular crystals may be obtained by re-solutions and cooling; the other fatty matters always appear as globules, clear and transparent, being much larger than the yellow-green pigment cells. I have not observed any further change of fats in the alcoholic fluid, although in ether (when cholesterin has been separated by the alcohol) silken tufts or sheafs of margarate soda are recognizable. I may remark that in all my examinations of recent bile, I have never found cholesterin as an ingredient; but when the sample in the field has stood a few hours, or if the bile itself be exposed while recent to the air, cholesterin is then found in small broken plates, similar to what may be removed from the substance of the liver by crushing a few cells and examining under the field.

The cholesterin of bile is either held in solution by the other fatty matter, or it is as yet undecomposed and a constituent of the original fat—one of the steps in the decomposition of which

is to form cholesterin. However this latter may be, it is not an evident constituent of fresh bile; when the alkaline nature of the liquid from any cause is diminished, then this substance commences to appear. We can at any time produce it by adding a drop of acid (acetic or mineral) either to bile or to the crushed bile cells, when the fatty matter will be broken up and one of the resulting products is cholesterin. I do not mean to assert that cholesterin is not present, but simply not present in a free state—it is held in solution probably by the more liquid fats; for inasmuch as cholesterin is not a formation of the liver itself, being the product of decomposition of nerve matter in the blood, and merely separated in the liver—as it is sometimes in serous fluids not sufficiently alkaline—it is reasonable to conclude that its appearance in bile which has been exposed to the air or otherwise oxidized, is an evidence of its pre-existence in a soluble form.

Yellow Coloring Matter.—This substance dialyzes the most readily of all ingredients, passing into all of the liquids in the outer vessel; freely into alcohol, more so into ether, chloroform, and coal oil; the chloroform liquid is the most convenient for examination, but coal oil preserves the matter unchanged. The liquids have all a more or less green tint, the ethereal liquid being the deepest. Fatty matter always accompanies the coloring matter.

When examined by a power from 300 to 400 times, the structure of this substance is evident; cells globular, deep yellow color in mass, aggregated in cloudy clusters, the globules having apparently granular contents; these however are fatty matters, as treatment by alkali and acids shows, and this is the reason why it is impossible to separate by dialyses the fatty globules from the yellow-green matter. These globules become of a deeper green on addition of a little nitric or other mineral acid.

It is not further affected by nitric acid, and does not yield the iridescent tints which bile matter affords. It is not soluble in alcohol or ether, but by long contact with these liquids the cell wall becomes broken or collapsed and the fatty matter dissolves in the alcohol or ether; perhaps this is effected by osmose through the cell wall. Alkaline solutions also separate the oil, but in this case the cell wall is dissolved, and the liquid assumes a slightly red tint, showing the presence of a protein compound in the cell wall. The yellow pigment is then a globular corpuscle having an albuminous pellicle and fatty substance in the interior. I am unable to state whether the color belongs to the wall or the central contents.

Lehmann states that this pigment is amorphous and colored red by acetic acid. In every instance I have assured myself of its cellular character, nor have I observed its being reddened by acetic acid.

Oil Globules.—Minute oil corpuscles may be seen in great abundance in the ethereal and alcoholic liquid dialyze; of all liquids alcohol appears to favor the dialysis most apparently. As there are no free oil corpuscles in bile, its appearance on dialysis is due to the liquid acting on the yellow globules, and causing the fat to osmose; the greater portion of the fat, if not all, comes from the yellow pigment cells; globules of fat are also found attached to and escaping from the surface of cholesterin crystals, if the latter be treated by dilute sulphuric or chlorhydric acids; these in a little time disappear, and thin prismatic crystals with flat summits are formed in the vicinity. By the actions of these acids on the pigment cells tufts of silky needles of wheat-sheaf form occur scattered through the cloud of pigment.

Margarates are the fats of the pigment cell, while that obseved to escape from the cholesterine is a glycocholate; this is proved by treating the field with strong sulphuric acid, when this glycocholic acid is broken up and an occasional hemihedral crystal of *glycin* is formed.

This (distinctive) separation of the two fats must not be looked upon as existing naturally. The cholesterin must have been previously in a fluid form to be secreted, and must have passed through the hepatic cell and most likely through the pigment cells. All the fatty acids must originally have been associated and some of them conjugated.

On the treatment of these fats with acid I have never observed any form like the crystal of *taurine* or of taurocholic acid, nor any substance having the reactions proper to that acid; from my own observations I conclude it is not present in human bile, and I am not aware of any competent authority having asserted its presence. Glycocholic acid is, I believe, the true biliary acid in the human subject, and is occasionally found uncombined in bile freshly removed from the recently dead.

Dalton asserts that in human bile there is no crystallizable substance; if by this he means bile in the living subject it may be so, otherwise it is totally at variance with what I have repeatedly observed, so frequently that I do not remember one example in which I did not find it in the dialyzed liquid, where the liquid had been kept for a few days. Among the green pigment corpuscles small prismatic crystals begin to appear—four

sided—with flat summits rarely overlapping, each well defined throughout; they are not seen at the same time with the pigment cell, but when the mill head screw is turned slightly, so as to approximate the stage, they then become quite distinct; they average 1-100 inches long, and at first view many appear to have the summits bevelled or dihedral, but careful observation will correct this deceptive appearance; they are always found most abundant with the greenish pigment; untreated by reagents they preserve their form for a considerable time; under the influence of acids they disappear, and as stated before, an occasional small crystal of glycin appears with a few drops of oily matter around it.

Sources of the Morphotic Elements.—No one who has examined the hepatic cell filled with bile, and also the pigment globules of the bile itself, can hesitate in recognizing the latter as the corpuscles of the hepatic cell; they are exactly alike in form, size, color, and consistence; they both yield fatty matter as well as coloring material, and both by aeration pass from yellow to green; both are slightly soluble in alcohol, more abundantly in ether, chloroform, and coal oil, and they do not undergo any other alteration by nitric acid in the cold than to produce the green tint. I assume it, therefore, that they are one and the same body, and that the contents of the hepatic cells are thus emptied out and delivered by the efferent ducts into the gall-bladder.

Besides these corpuscles, nuclei are seen in abundance loose among the clouds of pigment and the crystals of cholesterin; these are of larger size than could well be accommodated within the epithelial cells, and indeed these latter show little tendency to change the nucleus, being distinctly recognizable at the attached or smaller extremity; the larger free nuclei, therefore, belong to the hepatic cells, from which they have escaped along with the pigment cells; the cholesterin and other fats also escaping separate in a crystalline form.

From this it would appear that the whole contents of the hepatic cell is carried away; what, then, becomes of the cell wall? We must look upon the *brown* coloring matter as a residue of the cell wall, an altered protein substance, soluble in alkalies, not soluble in acids, assuming a violet, blue, and finally red-yellow tint by nitric acid, and showing all of the reactions by color which the bile is known to do with reagents; the play of colors of the bile is not, however, monopolized by this body, but is also given by the unaltered and partially disintegrated columnar epitelium floating in the liquid. These can by the

microscope be distinctly seen to become purple and blue on the addition of niric acid.

Brown Coloring Matter.—This substance is readily recognized under the microscope, as appearing in masses of various sizes, rarely exceeding that of a blood corpuscle; opaque, except at the edges, where it is of an amber tint, without any trace of structure; not altered by acetic or dilute acids; soluble in alkaline solutions by warmth, and by nitric acid moderately strong, which forms an amber-yellow solution with it; producing previously the various tints of color, blue, red, and brown; the dry mass, heated on platinum foil, swells up and fuses, and in a close tube gives off ammoniacal vapors. It, at first, by the reaction, might be mistaken for a resinous substance, but is a true albuminous or protein compound in various degrees of degredation. Under certain conditions the decomposition results in the production of crystals of *hæmatoidin;* at least this latter substance has been found in situations where no other nitrogenous substance was present to produce it. The appearance of hæmatoidin has, among other considerations, led physiologists to describe this brown substance as arising from effete blood corpuscles, separated from the portal blood by the cells, and carried down by the efferent vessels; but after repeated examination, I have never found any appearances justifying this belief; this brown substance is *not found in the hepatic cells nor in the substance of the liver;* it is in the *bile* of the ducts or the gall-bladder that it is detected, and bears all the marks of being the cell wall of old and broken-down hepatic cells whose contents have previously been removed.

Hippuric Acid—Hæmatoidin.—These substances I have met with, one example of each, in the twenty specimens examined; I shall not offer any considerations here about their appearance.

This mode of examining the bile by dialysis and microscopic examination of the dialyzed liquids must, if supported by other observers, lead us to reject the present view of the functions of the liver as a secretion, and of the nature and sources of the bile. We must adopt the view that the bile is simply an excretion, and its formation an act of depuration of the liver, whereby it relieves itself of its own effete parts. This is the view of Dr. Draper when he writes:*—"I therefore regard the bile as an excretion of materials which are decomposing and ready to be removed from the system." But he and others suppose that the waste materials come from the *cells of the blood*, and that the blood is thus purified by the removal of degraded blood

* Human Physiology, New York, 1856.

cells in the liver. I do not say this does not occur; but it forms no appreciable amount in the contents of the bile. It is not the blood cells, but the *liver cells* which form the solid matter of the bile; the hepatic cells, their contents, and the degraded cell wall form the great bulk of the morphotic elements; columnar epithelium, in all stages from integrity to decay, mucous corpuscles, and perhaps a little tessellated epithelium, formed the remainder; rare is it to find a trace of a blood cell in any degree of decomposition. It is not from blood cells, then, nor from venous blood directly that the bile is produced, but from a *wearing down of the tissue of the liver*, removing the hepatic cells, in a ruptured and worn-out state, by the only channel through which solid matter could be removed; that is, by the bile ducts. If it be true, as put forth by some, that the open mouths of the ducts directly touch the hepatic cells without any intervening membrane, then the mode of escape is apparent; the cell nearest the extremity of the duct ruptures, and pours its contents down into the latter, and thus leaves a space for other cells in similar effete condition to repeat the process.

If the bile, then, is but an excretion, what is the function of the liver? The explanation which I have given of the constitution of bile, and its probable origin, does not alter in any degree our notions of the action of the liver, which is to purify the portal blood by removing from it the cholesterin, fatty acids, and pigments by means of the hepatic cells, and also to separate sugar to be restored again to the blood.

In separating the fatty matters it would appear that the structure of the liver itself suffers, and requires to be removed, and it may be that this removal of the hepatic cell, after they have fulfilled their secretory functions to the utmost, by the bile *is the healthy process*, and that fatty degeneration of the liver may consist, not merely in an increased growth of hepatic cells, and their granular contents becoming loaded with oil, but in the circumstance that the cells are not removed as fast as produced; that by some altered condition of the cell wall it is not ruptured and the cell contents delivered into the bile ducts; this is a point to be determined by future observation alone.

The following conclusions are, I think, fairly deducible from the above:—

1. The bile is an albumino-serous liquid, holding diffused organic and organized matter, whose structure and origin may be traced by microscopic investigation.

2. The organized matters are derived from the *hepatic cells*—chiefly its inner granular matter—and from the epithelium lining the bile duct.

3. The fats of the bile are the fats of the bile cell derived from it, and have suffered no alteration, except their escape from inside the cell.

4. The bile contains two distinct coloring matters, the yellow and the brown; both of cellular origin, the latter only in a state of decay.

5. The yellow coloring matter of the bile is an organized body—a cell containing cloudy granular contents, which furnish fatty matter by decomposition; the fatty acids being the margaric and glycocholic, associated with cholesterin and soda; these yellow corpuscles are the yellow corpuscles of the bile cell.

6. The brown coloring matter is a protein compound, an albuminous substance undergoing decomposition, and is probably the remains of the cell wall of the hepatic cell whose contents constitute the matter described in No. 5. It is this brown matter which, by treatment, with nitric acid, yields the play of colors used as a test for the presence of bile.

7. The bile contains both the *materials* removed from the portal blood and the *anatomical structures* by which the removal was effected; the latter in a stage of retrogressive metamorphosis.

8. The bile is an excretion—a depuration of the liver directly, of the blood remotely.

As all of the specimens of bile alluded to in this paper were taken from diseased subjects, it may be objected to any inferences drawn that the bile does not represent that in health; as, however, the object of this paper is not so much to describe the chemical characters of normal bile as to show in what form the substances are actually found in human bile, the objection can have but little force in this place.

THE FRENCH SYSTEM OF MEDICAL EDUCATION.

In view of the interest excited by the suggestions for the improvement of medical education recently put forth by Professor Syme on behalf of the Scottish branch of the Medical Council, and as it is understood that the subject of further reforms in medical education is likely to be subsequently and warmly discussed by the General Council, it may not be *malapropos* that I should give you an outline of the system of study pursued under the direction of the French Government.

There is but one degree for doctors in medicine or in surgery. For this degree five examinations must be undergone before the Faculty. These consist of—1st. Anatomy and physiology, with the test of dissections. 2d. Internal (medical) and external (surgical) pathology, with the performance of operations. 3d. Materia medica, chemistry, and pharmacy. 4th. Hygiene and legal medicine. 5th. Medical and surgical clinical tests, and accouchements. The examinations are public; and the law provides that two of them shall be in Latin, but this has fallen into disuse. After the five examinations, the candidate for a degree must present and defend a thesis written by himself in French or Latin. Before, however, the student can reach the point at which he is admitted to any of these examinations, he has a long ordeal to pass through. Prior to commencing his career by "taking his first inscription" at the Faculty, which is equivalent to what is known as "entering" at the London schools, the student must produce his diploma as *bachelier es lettres*, or bachelor of arts; and before taking his third inscription (the inscriptions are for three months each) he must produce his diploma as bachelor of sciences. A modified diploma of bachelor of sciences is granted to medical students, which is especially adapted for them only. The student usually enters at about the age of twenty or twenty-one. He has to take a fresh inscription every three months, and to pass a special examination at the end of each year for three years. Thus, in addition to the five examinations for the doctorate, there are three annual examinations (*examens de fin d'annee*). These latter bear, first year, on chemistry, physics, and natural history; second year, on anatomy and physiology; third year, on medicine and surgery. Students are not admitted to the fifth, ninth, and thirteenth inscriptions respectfully, unless they have passed with success the "examination of the end of the year." They are only admitted to the examinations for the doctorate after the expiration of the last three monthly periods of the fourth year of study. The official fees for these inscriptions and examinations (independently of those for the diplomas of science and letters are, then, as follows, for the diploma of doctor:—

Inscriptions (sixteen, at 30 fr. each) - -	480 fr.
Three examinations at the end of each year (30 fr. each) - - - -	90 fr.
Five examinations, at the conclusion of four years' study, (50 fr. each) - - -	250 fr.
Five certificates of ability (40 fr. each) -	200 fr.

Thesis, - - - - -	100 fr.
Certificate of ability, - - -	40 fr.
Diploma, - - - - -	100 fr.
	1260 fr.

The fees for dissection and for unofficial courses which he has to take come to almost as much.

As to hospital practice, it is prescribed that no one shall be able to take his degree unless he shall have followed the hospital practice either as dresser [externe] or merely as pupil during at least one year. The prescribed curriculum commences after the ninth inscription has been taken—that is to say, at the beginning of the third year; and the four following inscriptions (which are essential in order to be admitted to examination) are not delivered to the student unless he bring with him a certificate of having diligently attended the practice during that time. Thus it will be seen that the French system differs in some material respects from the English. It requires the student to enter a number of courses; but it does not require him to attend them. It only exacts from him that he shall, in a long series of examinations, prove that he has acquired the requisite amount of knowledge. It is essentially a system of examination. The hospital practice need only be registered for one year. As to lectures, they are to be paid for; but they need not be attended, and, practically, they are very irregularly attended. The professors have themselves very much to blame for this, inasmuch as the chairs are habitually employed by their incumbents for the development, at great length, of their views on particular points of the science professed, rather than the systematic and complete teaching of the whole subject in the manner and to the extent required by the student for the purposes of his instruction, and to enable him to pass the stated examinations. The courses of the Faculty, in other words, are by no means squared with the examinations of the Faculty, or with the requirements of the Faculty. Hence the system of education, which is elaborately rounded and perfect to the eye, is, in fact, so imperfect as to require all sorts of supplementary aids. The student does not trust to the professors of the Faculty for his instruction; he trusts to his books and his private teachers. These abound: every one can teach in Paris; and although they are not recognized, these teachers are not the least influential. The Faculty give an unofficial recognition to a number of these private teachers by lending them (for a consideration) the amphitheatres in which to lecture; others

are content with lecturing in their private *cliniques*, and some are on the footing of our private grinders. Necessarily with this system of excessive examination, grinding is brought to great perfection; and the whole art of studying the peculiarities of the examiners, and knowing their pet questions and the expected answers, is developed to a greater pitch of completeness in Paris than in London. The last key to the examinations is a little book published by Dr. Berton, (1863), which gives systematic tables of the questions habitually asked at the various examinations, "with the answers of the examiners themselves to the most difficult questions." Some of the general remarks are too amusing to be passed over. "As a general rule," says this astute adviser, "the professors put questions specially on the subjects which they have developed during the year; but the *agreges* examine on all subjects indifferently, unless they have a private *clinique*, or a course at the Ecole Pratique, &c. They also—all of them—manifest a preference for the questions which have especially formed the subjects of their own theses and memoirs. It is useful, then, to know eight days beforehand your series, which can always be ascertained from some one of the secretary's department, or from those of the examiners which may happen to be your hospital teachers. Not only could you thus, under proper circumstances, pay any of them a visit of ceremony, or get yourself privately mentioned to them, but, by a little asking, you will ascertain the kind of questions they put. It will be well also to find out, in point of bibliography, the works which your examiners may have published, and the opinions, more or less personal, they have adopted—an examiner being always more than flattered to find a pupil sufficiently intelligent to reproduce in his presence his favorite opinions, whatever they may be, and the more so if they be little popular amongst the majority of authors. I would advise you, even *strongly*, to follow, during the eight last days —I speak of the third of the annual examinations—the hospital visit of one or other of your examiners, in order to become intimately acquainted with their opinions, and even with their language. They can but be the better disposed to you for doing this. If they have a *clinique* in town, whether free or by payment, enter yourself at this in the same way, even if it be but the evening before the examination.

Of course all this must be taken for what it is worth; but the extreme care with which the list of suggestions are arranged and classified, and the intelligence with which the particular views of the examiners are indicated in notes, sufficiently show

that all the weak points of the examiners are diligently studied, and even their special merits used as points of vantage for the pupil. There is one great defect in the French system: it is moulded into an apparent symmetry which is not real. It pretends to be a system of public instruction and public examination. It is, in fact, a system of public examination, but of private instruction. Then the students are obviously over-examined, and must be ground up to a choking point to suit the system. Three annual examinations, five examinations for the doctorate, besides *concours* for the *internats* and the *externats* and the *prix des hopitaux*—travelling over the widest possible range of anatomy, surgery, medicine, physiology, histology, and the accessory sciences—demand an amount of absolute cramming which has a definite an undeniable tendency to produce ultimate mediocrity. I am persuaded that if Mr. Syme were to look into the *Guide et Questionaire* of M. Berton, to which I have referred, his nervous system would sustain a severe shock, and he would immediately desire to "remonstrate with, censure, or, if necessary, depose the whole" body of teachers and examiners of Paris, as loading the memories of the pupils with indigestible details, as well as running through half the rest of his catalogue of pedagogic sins. A complete course of education in Paris is eminently conducive to cerebral congestion, and must load the brains of the pupils with a mass of minute details which no man's memory could retain permanently, and which are only got up for the purpose of the one examination, to be forgotten while preparing for the next. But this is almost an inherent defect in all medical education just now; and, in that it is more particular as to ascertaining that the candidates have the required knowledge than in inquiring where they got it, many persons will think the French system, by so much, more practical than the English, which carefully regulates the means of learning, as well as tests the information acquired.

I must return in a subsequent letter, to the subject of my last—the system of medical education pursued here, and the general arrangements of the hospitals and schools. Meantime, however, not to continue without a break a subject which is not equally interesting to all, I will revert to some of the scientific and practical aspects of medicine as followed here. Of course, medicine must be understood here to include also surgery, for although recognized in fact, the distinctions between surgery and medicine are not accepted in the language or in the theory of the Faculty. Surgeons are all doctors, and physicians have also a qualification in surgery; although M. Trousseau would

not think of amputating a leg, and, perhaps, Nelaton would not prescribe for a phthisical patient. Of the latter fact, however, I am not so certain; for since surgeons are also physicians, the etiquette in this respect is by no means rigid, and here, more than in London, would apply the celebrated definition medical and surgical patients ascribed to your "Nestor" of surgery,—Mr. Lawrence,—that "surgical patients were all those patients who paid fees, medical patients all those who did not." The limits between surgery and medicine are obviously altogether artificial and arbitrary; and the difficulty is well got over here by requiring the possession of a joint degree by every practicing physician and surgeon, and leaving it to himself to determine the particular line of practice according to his bent or the force of circumstances. The line is especially difficnlt to draw in obstetric practice, usually followed by physicians in England and elsewhere, but involving a multitude of operative proceedings requiring much surgical skill.

It is precisely of obstetric operative practice that I have to speak in this letter. Dr. Marion Sims, of New York, is now practing in Paris, and as the improvements which he has introduced into what may be called the surgery of females have revolutionized that department of the art all over the world, and his procedures have formed the basis of a new and happy era in the treatment of the series of fistulæ and other diseases of women which were previously incurable, it will be interesting to give some particulars of what he has been doing here surgically since, like many other Americans, he has sought a home in Europe.

Dr. Sims had already achieved a great reputation in America and England by his introduction of silver wire sutures—certainly one of the most important surgical improvements of the century; and by his immediate application of this discovery to the cure of all kinds of fistulæ and clefts in the mucous canals. The success with which he operates on deformities and deficiencies of this kind was not, however, at first fully appreciated in Paris; and when he came over, he was asked to operate on some of the most difficult cases of prolapse of the bladder from sloughing of the tissues, and utero-vesical and vaginal fistulæ, which were known to exist in this capital. He had a triumphant success in these cases, which had been abandoned as hopeless, but which he cured with a single operation; and his reputation soon extended so greatly that he was summoned to the highest and most important personages, and the Emperor has given him a special permission to practice in Paris. It is no breach of

confidence, since the fact has already appeared in print, to mention that Dr. Sims has been consulted by the Empress, whose general health is good, but who is known to be delicate.

The great improvements which have constituted Dr. Sims's most precious contributions to obstetric surgery are sufficiently well known in England, but as he is a man who has all his life done much more than he has talked or written about I will only jot down some of the facts which I have gathered as to his practice in some matters of special interest, in which he has, without publishing, anticipated a good deal that has subsequently been published, and forms the theme of discussion.

I pass over other more ordinary fistulæ in which his simple and successful practice, with or without the complications of his pupil Bozeman, is generally followed, to speak of cases of utero-vesico-vaginal fistulæ where the neck of the uterus—more particularly the anterior portion of it—is thoroughly destroyed. Dr. Sims's method of curing the fistula is by bringing its vaginal borders together in such a manner as to shut up the cervix uteri in the cavity of the bladder. The vagina then become a blind pouch. The menses pass into the bladder, mingle with the urine, and the patient passes bloody urine during the menstrual flow. The last operation of this kind which Dr. Sims performed was in Paris, about ten months ago, and in the presence of Dr. Rayer, the late dean of the Faculty, Sir Joseph Oliffe, Dr. M'Carthy, and others. His first operation of this sort was in Alabama, in 1849. I believe it is now a recognized proceeding in London, and Mr. James Lane has lately recorded a singular case in which, even after this operation, the patient became *pregnant*, probably through the medium of some capillary communication left between the vagina and the uterus. I have not seen the details of that case, but in the latter particular it is unique. Dr. Marion Sims has performed the operation more than a dozen times, and has not seen any inconvenience from it.

You published last year a paper by the London surgeon whom I just mentioned—Mr. James Lane, "On Lithotomy in the Female bladder," in favor of the vesico-vaginal incision. Dr. Sims considers that the facility and invariable success with which a cut in the vesico-vaginal septum may now be closed suggest this as "the only justifiable operation for stone in the female bladder." He performed this operation first 1850. It has since been repeatedly performed in America by Dr. Emmett, of the Women's Hospital of New York, and by Dr. Bennett, of Connecticut. The simplicity, safety, and unfailing success of the operation are spoken of in warm terms.

The application of this to the parallel method of *recto-vesical lithotomy in the male*, is a subject worthy of careful consideration. Recto-vesical lithotomy *in the adult* is a proceeding which was used long before the introduction of metallic sutures, and was followed with modifications by Mr. Lloyd, of St. Bartholomew's. Without these sutures it was liable to a serious objection—the occasional persistence of recto-vesical fistula. The silver-wire sutures, however, promise to obviate this inconvenience, Dr. Sims has mentioned to me a case in which Dr. Bauer, of New York, operated by this plan in 1859, Dr. Sims putting in the sutures. He says:—"The patient was placed on the left side, and my speculum was introduced into the rectum, exposing the anterior wall of the rectum, just as it would the vagina in the female. A sound was passed into the bladder. The Doctor entered the blade of a bistoury in the triangular space bounded by the prostrate, the vesiculæ seminales, and the peritoneal reduplication. He passed the finger through this opening, felt the stone, and removed it with the forceps without the least trouble. The operation was done as quickly and as easily as it would have been in a female through the vaginal septum. After the removal of the stone, Dr. Bauer kindly asked me to close the wound with silver sutures, which I did, introducing some five or six wires with the same facility as in the vagina. There was no leakage of urine. The patient recovered without the least trouble of any sort. The wires were removed on the eighth day, and on the ninth day the patient rode in a carriage with Dr. Bauer a distance of four or five miles, to call on and report himself to our distinguished countryman, Dr. Mott. The facility and safety of executing recto-vesical lithotomy (except in children for anatomical reasons), and the success of closing at once the cut by the introduction of metallic sutures, ought to make this the operation in the male."—*London Lancet.*

Mortality of Liverpool.—The annual report of the medical officers of this borough states that during the last year the deaths registered in the borough amounted to 15,266—a number greater than in any year since 1849, and 524 above the corrected average of the last decenniad.

British Surgery in Paris.—At a late meeting of the Surgical Society of Paris, three well-known surgeons belonging to this country were unanimously elected foreign associates, viz: Mr. Robert Adams, of Dublin, Mr. Joseph Hodgson, and Mr. James Paget, both of London.—*London Lancet.*

Book Notices.

THE MEDICAL FORMULARY: Being a Collection of Prescriptions derived from the Writings and Practice of many of the most Eminent Physicians in America and Europe. Together with the usual Dietic preparations and Antidotes for Poisons. To which is added an Appendix on the Endermic use of Medicines, and on the use of Ether and Chloroform. The whole accompanied with a few brief Pharmaceutical and Medical Observations. By BENJAMIN ELLIS, M.D., late Professor of Materia Medica and Pharmacy in the Philadelphia College of Pharmacy. Eleventh Edition, Carefully Revised and much Extended, by ROBERT P. THOMAS, M.D., Professor of Materia Medica in the Philadelphia College of Pharmacy. Philadelphia: BLANCHARD & LEA. 1864.

This is a neatly published volume of 341 pages, the contents of which are fully indicated by the above lengthy title. The work has long been before the profession, and its merits are well known. The present edition contains many valuable additions, and will be found to be an exceedingly convenient and useful volume for reference by the medical practitioner.

For sale by W. B. KEEN, 148 Lake street, Chicago.

ON ASTHMA: ITS PATHOLOGY AND TREATMENT. By HENRY HYDE SALTER, M.D., F.R.S., Fellow of the Royal College of Physicians; Assistant Physician to the Charing Cross Hospital; Lecturer on Physiology and Pathology at the Charing Cross Hospital Medical School. Philadelphia: BLANCHARD & LEA. 1864.

This is an octavo volume of 260 pages, neatly bound in cloth. The author discusses the nature and treatment of Asthma in a very thorough and interesting manner. His views regarding the pathology of the disease may be inferred from the following propositions:—

"1. That asthma is essentially, and, with perhaps the exception of a single class of cases, exclusively a nervous disease: that the nervous system is the seat of the essential pathological condition.

"2. That the phenomena of asthma—the distressing sensation and the demand for extraordinary respiratory efforts—immediately depend upon a spastic contraction of the fibre-cells of organic or unstriped muscle, which minute anatomy has demonstrated to exist in the bronchial tubes.

"3. That these phenomena are those of excito-motory or reflex action.

"4. That the extent to which the nervous system is involved differs very much in different cases, being in some cases restricted to the nervous system of the air-passages themselves.

"5. That in a large number of cases the pneumogastric nerve, both in its gastric and pulmonary portions, is the seat of the disease.

"6. That there is a large class of cases in which the nervous circuit between the source of irritation and the seat of the resulting mascular phenomena involves other portions of the nervous system besides the pneumogastric.

"7. That there are other cases in which the source of irritation, giving rise to the asthmatic paroxysm, appears to be central—in the brain; consequently, in which the action, though excito-motory, is not reflex.

"8. That there is yet a class of cases in which the exciting cause of the paroxysms appears to be essentially humoral."

These propositions are thoroughly discussed and sustained by an interesting variety of facts and cases. But we have neither time nor space to give even an outline of the treatise before us. It is one of the books that will repay the practitioner for a careful perusal.

For sale by W. B. KEEN & Co., Lake street, Chicago.

A TREATISE ON PRACTICAL PHARMACY. Designed as a Text-Book for the Student, and as a Guide for the Physician and Pharmaceutist. Containing the Official and many Unofficial Formulas, and numerous examples of Extemporaneous Prescriptions. By EDWARD PARRISH, Graduate in Pharmacy; Member of the Philadelphia College of Pharmacy; of the Academy of Natural Sciences of Philadelphia; and of the American Pharmaceutical Association; Principal of the School of Practical Pharmacy of Philadelphia. Third Edition. Thoroughly Revised and Improved, with Important Additions. With Two Hundred and Thirty-eight Illustrations. Philadelphia: BLANCHARD & LEA. 1864.

This is a large-sized octavo volume of 850 pages. The former editions have been sufficiently long before the medical public to render the merits of the work well known. It is certainly one of the most complete and valuable works on practical pharmacy to which the student, the practitioner, or the apothecary can have access.

For sale by W. B. KEEN & Co., Lake street, Chicago.

BRAITHWAITE'S RETROSPECT OF PRACTICAL MEDICINE AND SURGERY—FOR THE HALF-YEAR ENDING JANUARY, 1864. Uniform American Edition. Published by W. A. TOWNSEND, 39 Walker street, New York.

The great convenience and value of this semi-annual summary of medical literature is too well known to the profession to require any comments from us.

Price $2 per annum in advance.

TO KNOW: ITS SOURCE, ITS MODE, AND ITS POWER. An Introductory Address, Delivered at the St. Louis Medical College, November 2d, 1863. By FRANK. W. WHITE, A.M., M.D., Professor of Materia Medica and Therapeutics.

This is a well-written address, earnest and elevated in its tone, and admirably calculated to excite activity and a proper emulation in those to whom it was addressed.

Editorial.

ILLINOIS STATE MEDICAL SOCIETY.—The next regular Annual Meeting of this Society will be held in this city (Chicago) on the first Tuesday in May next, commencing at 10 o'clock A.M. The Committee of Arrangements are making all necessary local preparations for the accommodation of the Society. We can assure the Profession, in every part of the State, that all who may come to the meeting will be cordially received. Each local society is entitled to one delegate for every ten members, and an additional delegate for a fraction of more than half of ten. Every regularly organized medical college is entitled to two delegates; and each hospital for the treatment of the sick, to one delegate. Besides delegates, the constitution provides for the election at each Annual Meeting of permanent members, and of members by invitation.

Hence, we hope all who feel an interest in the advancement of the profession will attend the coming meeting. In addition to reports and papers from Standing and Special Committees, on a variety of important subjects, there are several questions

of great interest that might be properly and profitably considered by the Society. The practicability and desirableness of establishing a single Board of Examiners in each State, for the examination of all candidates for admission into the profession, is a proposition again undergoing discussion in the New York State Medical Society and elsewhere. And it is quite probable that it will be brought prominently before the next meeting of the American Medical Association, where the delegates from our own State Society may be called upon to record their votes concerning it. Is the present mode of recommending the use of alcoholic beverages in medical practice, as guarded and free from injurious consequences as it should be? This is another question of great practical importance, and worthy of more serious consideration than it has yet received.

We anticipate a full and interesting meeting of the Society.

CHICAGO MEDICAL COLLEGE—MEDICAL DEPARTMENT LIND UNIVERSITY.—The Fifth Annual Commencement of this institution was held in the Hall of the College, on the 1st instant. The Hall was well filled with an attentive and appreciative audience. The degree of Doctor of Medicine was conferred on seventeen candidates, who, with their diplomas, received from the President of the Faculty, Prof. H. A. JOHNSON, a short but eloquent and impressive charge concerning the privileges and responsibilities of their new position. Prof. H. WING then delivered a highly interesting and instructive Valedictory Address, which will be published in full in the next number of the EXAMINER. At the close of the address, it was announced that the regular summer course of instruction would commence on the second Monday in March, and continue until the first Monday in July. The audience was then dismissed, and the students, graduates, and Faculty, with the invited guests, repaired to the residence of Prof. H. A. JOHNSON, where they found an elegant entertainment, and enjoyed a most pleasing social interview until a late hour of the night. The college term, thus pleasantly closed, had been a highly prosperous and satisfactory one. The whole number of matriculants was eighty-nine, and the number of graduates seventeen.

The attendance in all the departments, Junior, Senior, and Clinical, had been uniform and punctual to the last day of the session. The possession of good and permanent college building and grounds; the long period of Annual Lectures; the addition of the Summer Recitation and Clinical Course; the proper arrangement of courses in a progressive instead of a repetitional order; and the complete identification of hospital clinical instruction as a necessary part of both the winter and summer terms, makes this institution the most complete and comprehensive medical school in this country.

CHICAGO, March 1, 1864.

DR. DAVIS, EDITOR EXAMINER:—*Dear Sir:*—Dr. A. M. JOHNSON, of Peoria, recently stated to me a number of facts going to show that the bark of the common sugar maple is highly efficacious in the treatment of intermittents. I state none of the facts, because it is the object of this communication merely to throw out the suggestion, to be tested by those who have opportunity and inclination.

I am not unaware of the many sources of fallacy in a point like this, but I have great respect for Dr. JOHNSON'S opinion, and he was very sanguine that the most decided results would be obtained by a trial of the article.

The directions for use are the old popular formula:—Take a pugillum of the bark, steep it in a pint of water, and drink freely of the infusion.

Yours, &c., H. WING.

AMERICAN MEDICAL ASSOCIATION.—The Fifteenth Annual Meeting of the "American Medical Association" will be held in the city of New York, commencing Tuesday, June 7th, 1864, at 10 o'clock A.M. Proprietors of medical journals throughout the United States and their Territories are respectfully requested to insert the above notice in their issues.

H. A. JOHNSON, }
GUIDO FURMAN, } *Secretaries.*

We take pleasure in calling attention to the above notice of the next Annual Meeting of the American Medical Association.

The Meeting will, undoubtedly, be one of the largest and most important that has been held since the formation of the Association. We think the committees, appointed at the last meeting, will, in most instances, be prepared to report; and consequently there will be an unusual number of valuable papers for consideration. It is highly probable, also, that some of the important questions connected with medical education, will be presented in a manner to command more definite and practical action than heretofore. Let the profession of the North-west see to it, that they are well represented.

Every city, county, district, and State Society is entitled to one delegate for every ten of its members; each medical college, and hospital containing one hundred beds for the sick, to two delegates; and all hospitals with less than one hundred beds, to one delegate. We earnestly urge all the societies, colleges, and hospitals, whether civil or military, to select such delegates as will attend the meeting, and send as early as possible a list of their names, either to the local secretary, GUIDO FURMAN, M.D., New York, or to the chairman of the committee of arrangements.

LETTER FROM DR. W. N. COTE.

PARIS, Feb. 4, 1864.

CHEAP FOOD IN PARIS.

The Philanthropic Society of Paris has published its report for 1862. From the ten cheap food kitchens established in different parts of the capital, it distributed 290,016 portions of food, the produce of which was 11,709 francs, and the expenses 22,522 francs. In the six dispensaries, 1,775 patients received medical assistance, whilst 1,659 gratuitous consultations were given. Out of that number of sick, 81 died, being a smaller proportion than takes place in the hospitals. The expenses of those dispensaries for 1862, amounted to 41,985 francs, including medicines and bath, or an average of about 24 francs per patient. The budget of the Society for 1862, is stated as follows:—The balance in hand was 35,508 francs, and the receipts 66,665 francs, making a total of 102,173 francs. The general expenses amounted to 77,856 francs, showing a surplus of receipts of 24,317 francs. As you are no doubt aware, five francs equal a dollar.

TREATMENT OF BRONCHOCELE.

Bronchocele, or goitre—a disease which is marked by a tumor on the forepart of the neck, seated between the trachea and skin, and usually occupying the thyroid gland—is very often met with, and, on account of the inconvenience it generally causes, has been a subject of much attention on the part of surgeons. Various methods of treatment have been instituted against this common disorder. Some surgeons have resorted to extirpation, an operation first recommended by Celcus, and which has sometimes proved successful. But it is quite unsafe to attempt its removal with the knife, on account of the enlarged state of its arteries and its vicinity. Palfin, in his Anatomie Chirurgicale; Dr. Bell, in his Surgical Works; Desault, Bonetus, Severinus, and Dupuytren, testify to the danger of this operation, and many patients have died in the hands of the most expert and enterprising surgeons. Cases are recorded, however, where operations of the kind have been attended with success, but it must be confessed, they are extremely rare, and extirpation should be resorted to only when bronchocele has become so large as to endanger suffocation.

Dr. Blizzard, of London, recommends the tying up of the great arteries in the vicinity of the tumor, from which it chiefly derives support. This operation is preferable to excision of the thyroid gland, inasmuch as it presents comparatively but little danger. Internally, a remedy which has proved very efficacious in this disease is burnt sponge, administered usually in the form of lozenges, which consist of cinnamon, gum arabic, syrup, and calcined sponge. It may be given in the form of powder, mixed with honey and other materials, or the simple decoction of the sponge, as recommended by Herrenschward, of Berne, in Switzerland. Many persons laboring under bronchocele, have been cured by this remedy, some of whom began to suffer much, and to be seriously alarmed on account of the difficulty of respiration and deglutition with which their complaint was attended. Sulphate of potash, continued for several weeks in large doses, is said to have effected many cures, in the hands of Fodere and other practitioners. It should be given dissolved in water, in the proportion of thirty grains to a quart daily. Besides burnt sponge and sulphate of potash, mercury, pumice stone, muriate of barytes, egg-shells, muriate of lime, digitalis, muriate of iron, belladonna, electricity, pressure, frictions, issues, setons, blisters, and caustic, have been employed against bronchocele. With what success does not appear. I now see by the *Journal de Societie de Medicine de Rouen*, that *iodine* is

highly recommended as a remedy for goitre. It is employed according to the following formula:—

Take pure glycerine,	1000 grammes=2 lbs.
Common dry soap (pulverized)	50 grammes=1½ oz.
Dry powder of Iodate of Potassium,	130 grammes= 4 oz.
Essence of sweet almonds,	2 grammes=40 gr.

To be rubbed over the tumor as often as necessary. At the same time the patient should take internally, solution of the tincture of iodine, made of four grammes of iodate of potassium, dissolved in thirty of the tincture. Three, four, or five drops may be given at every meal. At night, before going to bed, a pinch of the powder of calcined sponge may be administered, good diet, dry habitation, exposure to the sun, sea baths. Such is the treatment usually followed in the Department of the Seine Inférieure. Iodine was first introduced into practice by Dr. Coindet, of Geneva, who employed it with success as a remedy for bronchocele.

ACADEMY OF SCIENCES—PRIZES.

The Academy of Sciences lately held its annual session at the Institute, Dr. Velpea presiding. The prize for *Experimental Physiology* was given to Dr. Moreno. For *Medicine and Surgery*, the Academy awarded to Dr. Chassaignac a prize of 2,500 francs, and to Drs. Bourdon, Cahen, Debont, and Gallois, an honorable mention, with 1,500 francs for each. For *Insalubrious Arts* a prize of 2,500 francs was given to M. Grimaux de Caux, for his work "On the Supply of Water to Towns and Rural Habitations." A prize of 2,500 francs to M. Guignet, for the preparation of non-injurious green for printing on tissues; and a recompense of 1,500 francs to M. Bouffe, for having discovered a substitute for arsenical green in the manufacture of artificial flowers.

The following are the prizes on medical subjects proposed for this year and the ensuing ones by the Academy, the papers in all cases to be sent in headed with some motto, to be repeated on a sealed envelope containing the name of the author. 5,000 fr. "To give a complete History of Pellagra," (March 31st, 1864.) 5,000 fr. "On the Application of Electricity to Therapeutics, (March 31st, 1865). 20,000 fr., the Academy and Emperor's prize, "For Method of Preserving Members by Preserving the Periostem," (March 31st, 1866). Lastly, the Breant prize of 100,000 fr. for the discovery of an unquestionable specific against cholera, or, in default of this, a prize of 4,000 fr.

to the competitor who can prove that there exist in the air substances which may materially contribute to the propagation of epidemical diseases.

SENILE CATARACT.

At the Medico-Surgical Congress of Rouen, Dr. Wecker read a paper on *The Surest Method of Removing Senile Cataract.* You are aware that there are two or three different operations now in use—*couching* or *depression* of the cataract, an operation practised, it is thought, long before the time of Celcus, and which consists in lacerating freely, but cautiously, with the point of a needle, the anterior capsule of the lens, and then pressing the lens itself downward and backward, and lodging it in the vitreous humor. Another method is that denominated by Sir William Adams, as the *absorbent practice*, and said to have originated with Mr. Pott. The aqueous humor having been found to have a solvent power, advantage is taken of this circumstance, by pushing fragments of the lens which happen to be detached during the operation of couching into the anterior chamber. Two operations are in use, each founded on the absorbent principle—the *anterior* and *posterior*—the former being performed by penetrating the cornea at its lower and outer part about a line anterior to its union with the sclerotic coat, whilst in the posterior operation the opening is made in the schlerotic coat instead of the cornea. There remains another operation which is often resorted to—*extraction* of the cataract, which is performed by a knife instead of a needle. The knife is introduced above the equator of the cornea, and about a quarter of a line anterior to its junction with the sclerotica, with the edge downward, passing it slowly and steadily along through the anterior chamber until its point emerges at the inner edge of the cornea. The section of the cornea being made, the aqueous humor is discharged, and the anterior capsule of the lens is then cautiously lacerated precisely in its centre, and brought out through the opening made in the cornea. As soon as the lens is removed, the flap of the cornea is adjusted, the lids closed, and a bandage applied lightly over both eyes. Hitherto surgeons have been exceedingly cautious against wounding the iris, and in order to guard against this, Baron Wenzel has recommended friction of the cornea with the end of the finger during the passage of the knife, an expedient which causes the iris to retire immediately from the edge of the knife, and remain so long as the friction is continued.

Dr. Wecker recommends the following method of extraction,

which consists in making the section of the cornea near the conjunctival angle so as to include the most vascular portions of that membrane, and their excising with curved scissors from three to four millimetres of the iris. This is what Dr. Wecker calls modified method of extraction. Iridectomy may be practiced some time before extraction, so that the wound of the iris be wholly cicatrized when the moment comes for operating on the cataract. W. N. COTE.

—*Medical and Surgical Reporter.*

FORMULA FOR A SOLUTION OF BROMINE.

By Dr. J. LAWRENCE SMITH, Professor of Chemistry in the Medical Department of the University of Louisville.

The frequent demand for bromine from the Louisville Chemical Works, which are under my direction, induced me to inquire for what purpose it was used, and I learned that it was being employed as a therapeutic agent, especially in the form of vapor mixed with air as a purifier of the atmosphere of hospitals, where erysipelas, gangrene, small-pox, &c., existed, and also internally in certain affections of the throat. Knowing full well the inconvenience of the use of the substance in the form called for, I at once undertook to compound a solution which would meet the ends required, and be more convenient for any therapeutical use to which uncombined bromine might be applied. From the slight solubility of bromine, any attempts to dissolve it in water would give too dilute and bulky a solution, the natural suggestion, therefore, was to use but little water and facilitate its solubility by adding bromide of potassium; at first the following proportions were used:—1 troy ounce of bromine, 120 grains bromide of potassium, and 1 fluid-ounce of distilled water; the formula left a small quantity of bromine undissolved, and the solution was too concentrated. After varying the proportions in different ways, I have settled on the following as the most convenient formula:—

℞.—Bromine, 1 troy ounce; bromide of potassium, 160 grains; distilled water, q. s. to make four fluid-ounces of the whole mixture.

Dissolve the bromide of potassium in about two fluid-ounces of water in an eight ounce bottle, then add the bromine, agitate gently until the solution is complte, then add water enough to bring the whole to four fluid-ounces.

This mixture forms a very dark red solution, evolving strong

fumes of bromine, and readily soluble in any additional quantity of water.

I have given this formula as one that will doubtless recommend itself to those of the medical profession engaged in using bromine, and it is already being used by the medical profession of this place.—*American Journal of Medical Science, April*, 1863, *p.* 385.

ON THE USE OF COLLODION WITH GLYCERINE IN ERYSIPELAS.

The substitution of a glycerinated collodion for the common collodion will completely prevent the cracking of the skin and other unpleasant consequences which often occur when the latter is used as a dressing in erysipelas of the face.

The manner in which it should be prepared, according to Dr. W. Abbotts Smith's recent small work "On Glycerine, and its Uses in Medicine, Surgery, and Pharmacy," p. 30, is by adding two parts of glycerine to one hundred parts of common collodion. The addition of this small proportion of glycerine is sufficient to impart considerable suppleness to the collodion, and to prevent its dragging upon and cracking the delicate tissues to which it is applied.

[Equal parts of collodion and castor oil are recommended by another writer.]—*Lancet, October* 31, 1863, *p.* 527.

Professional Dignity in France.—Our readers have not forgotten how certain parties have of late been summarily dealt with by the Medical Council and the College of Surgeons for unworthy conduct. A measure of the same kind has lately been adopted by the Academy of Medicine of Paris respecting a medical man named Priou, practicing at Nantes. This individual was a Corresponent of the Academy, and had lately, at the Medical Congress of Rouen, bills posted all over the town with advertisements of the most reprehensible kind. The members of the Congress protested very energetically, and the Academy has at last taken up the matter. It has been decided that Priou, for this forgetfulness of professional dignity, should be erased from the list of correspondents.

Perseverence.—The chair of Surgery of the Faculty of Turin was lately competed for by Messrs. Pacchiotti and Bottini. The former beat his adversary and obtained the professorship, for which he had competed *five times* previously.

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